A Review of 2003 / 2004 British Columbia Herring Fisheries

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A REVIEW OF 2003 / 2004 BRITISH COLUMBIA HERRING FISHERIES

by

B. Rusch and L. Hamer

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ABSTRACT

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The Pelagic Subcommittee of the Pacific Scientific Advice Review Committee (PSARC) recommended a biological yield of 61,189 tons for five major British Columbia herring stock assessment regions in 2004. Whole herring and / or herring spawn was harvested in the following fisheries: food, social and ceremonial; roe; spawn on kelp; winter food and bait; commercial, sport, personal use bait; charity sales; zoo and aquarium food and test fishing. The 2004 coast wide roe herring quota was 29,455 tons, and 24,251 tons were caught.

RÉSUMÉ

Rusch, B. and L. Hamer. 2004. A review of 2003 / 2004 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 275: vi + 64 p.

Le sous-comité pour la pêche pélagique du Comité d'examen des évaluations scientifiques du Pacifique (PSARC) a recommandé d'établir à 61,189 tonnes la productivité de cinq grandes régions de pêche au hareng de la Colombie-Britannique en 2004. Des harengs et/ou des oeufs de harengs ont été récoltés dans les secteurs de pêche suivants : pêche autochtone à buts alimentaire, social et cérémoniel; pêche des oeufs de hareng; pêche des oeufs de hareng sur varech; pêche minotière et pour les appâts; pêche commerciale, pêche sportive, pêche pour appâts à usage personnel; ventes à but caritatif; alimentation des animaux captifs (zoos et aquariums) et pêche exploratoire. Le quota pancôtier de pêche au hareng rogué pour 2004 était de 29,455 tonnes, et 24,251 tonnes ont été capturées.

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1.0 INTRODUCTION

Herring have been one of the most important components of British Columbia commercial fisheries over the past century, with catch records dating from 1877. The fishery has evolved from a dry salted product in the early 1900's, to a reduction fishery in the 1930's, to the current roe fishery that began in 1972. In addition to the roe fishery, whole herring and / or herring spawn is harvested in the following fisheries: food, social and ceremonial; spawn on kelp; winter food and bait; commercial, sport, and personal use bait; charity sales; zoo and aquarium food; test fishing and research.

In this report, we briefly summarise stock assessment results and forecasts, and document allocations to all 2003 / 2004 herring fisheries. Management structures of the various herring fisheries are described, and catch information is presented. Sections detailing the dates and locations for roe herring fisheries, winter food and bait fisheries, and test fisheries are also included. Additionally, the 2004 spawn report, including dates, lengths, and widths of known spawning by location and statistical area are presented.

2.0. STOCK ASSESSMENT

Planning for herring fisheries traditionally begins in the summer with a review of herring stock assessment information by the Pelagic Subcommittee of the Pacific Scientific Advice Review Committee (PSARC). The Pelagic Subcommittee is made up of herring research staff from the Stock Assessment Division at the Pacific Biological Station, and herring fishery managers from the Resource Management branch. Additional participants in the September 3 2003 Pelagic Subcommittee meeting included representatives from three First Nations; the Herring Conservation & Research Society (HCRS); Spawn on Kelp Operators Association (SOKOA); the Fishing Vessels Owners Association (FVOA) and industry representatives. At this meeting, an assessment of the 2003 herring abundance was made, and abundance for 2004 was forecast (Table 1) for the five major stock assessment regions (Figure 1).

Herring stock assessments in 2004 were made using the age-structured model (RASM-2q) (Schweigert 2003). The model uses the available 53-year time series of catch, spawn, weight-at-age, and age-structure information. The estimated spawning escapement in each assessment region is used to forecast abundance for the next fishing season by applying average growth and survival rates to estimate the biomass of returning adults. Forecast biomass is calculated as the total of repeat spawners, plus new "recruits" (i.e. first time spawners). Three alternative stock forecasts are generated for the coming year from the model using averages of the third poorest, middle third and third best of the historically observed recruitment to provide estimates of "poor", "average" and "good" recruitment assumptions. In general, the average recruitment forecast is adopted for the coming season unless ancillary information is available to indicate recruitment will be better or poorer than average.

The five major British Columbia herring stock assessment regions (Figure 1) are currently managed by a fixed harvest rate strategy in conjunction with fishing thresholds or "Cut-off" levels for each region. Recommended yields are set at 20 percent of the forecast biomass for each of the major assessment regions, provided the recommended yield does not reduce the

biomass below the Cut-off. The 20 percent harvest rate is considered to represent a conservative level of removals given the biological productivity of the major herring stocks (Schweigert and Ware, 1995). Cut-off levels are set at 25 percent of the estimated unfished average biomass, as determined by simulation analyses. As the forecast abundance approaches the Cut-off level, the recommended yield is calculated as Catch = Forecast Run – Cut-off. When the forecast falls below the Cut-off, a decision may be made to close the region to commercial fishing.

2.1. Recommended Yield for 2004

The forecast biomass for 2004 for the five major stock assessment regions totalled 280,169 tonnes, or 308,833 tons[1] (Schweigert, 2003). The Pelagic Subcommittee of PSARC reviewed the forecast, and recommended a biological yield of 61,190 tons for 2004 (PSARC, 2003). This represents a 28 percent increase from the total recommended yield of 47,829 tons in 2003.

The RASM-2q forecast of 2004 biomass was used in all areas. The recruitment assumption, corresponding 2004 pre-fishery biomass forecast, and the recommended yields for each of the major stock regions are summarised in Table 1.

In the Queen Charlotte Islands, an average recruitment option was adopted for 2004. The pre-fishery biomass forecast was 14,043 tons, assuming average recruitment, which would result in a recommended harvest for the QCI area of 2,249 tons.

An average recruitment option was adopted in the Prince Rupert District. The pre-fishery biomass forecast for 2004 was 44,875 tons, resulting in a potential harvest of 8,973 tons.

An average recruitment option was also used in the Central Coast, resulting in a pre-fishery biomass forecast of 40,311tons. Application of the 20 percent harvest rate resulted in a recommended yield of 8,058 tons.

In the St. of Georgia, a good recruitment assumption was adopted, resulting in a 2004 forecast pre-fishery biomass of 172,402 tons, which allowed for a potential harvest of 34,469 tons.

Results from the 2003 offshore research cruise indicated that a poor recruitment forecast should be adopted for the WCVI area in 2004. This resulted in a forecast pre-fishery biomass of 37,203 tons allowing for a potential harvest of 7,441 tons.

The Subcommittee recommend a harvest of 95 tons for Area 27, based on an estimated spawning biomass of 945 tons in 2003. (For minor stocks, the yield is calculated as 10 percent of the assessed 2003 abundance.) Based on the limited spawn assessment in Area 2W, the subcommittee recommended a harvest of 161 tons, based on a measured spawning biomass of 1,612 tons.

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[1] Traditionally, all estimates and forecasts listed in PSARC documents are in metric tonnes. "Short tons" (i.e. 2000 pound tons) are the measurement unit of choice for the Herring Working Group, Herring Industry Advisory Board, and Industry in general. For the sake of consistency throughout this document, all weights given will be in tons.

3.0. MANAGEMENT PLANNING PROCESS

Operational planning for the 2004 herring roe fishery and other herring fisheries began in September with bilateral meetings with First Nations. At these meetings, current herring stock status information and yield recommendations for 2004 were presented. Attendees were provided the opportunity to comment and advise on any issue pertaining to herring resource management in their local area. Stakeholder comments and advice obtained from these meetings were carried forward to regional advisory sessions, including the Herring Technical Working Group (HTWG) and the Herring Industry Advisory Board (HIAB) meetings, held in late September and early October.

The HTWG is made up of departmental staff augmented by a limited number of First Nations, commercial fishing industry representatives, and a representative from the BC Ministry of Fisheries. At the September meeting of the HTWG, the expected herring utilisation for all non-roe herring fisheries was accounted for in an "expected use table" (Table 2). The remaining herring total allowable catch (TAC) in each of the five stock regions was then allocated to the roe fishery. The resulting roe fishery catch allocations were used in the development of a series of preliminary coastwide harvest options. In developing roe fishery options, consideration was given to advice provided by First Nations and other members of the public in prior advisory sessions. The committee also prepared recommendations for roe fishery management strategies and reviewed plans for the herring test fishery program.

All recommended management options and strategies were carried forward to subsequent meetings of the HIAB. This committee is made up of participants from twelve organisations representing all sectors of the herring fishing industry. Representatives from coastal First Nations also participated in the 2003 HIAB meetings. HIAB was tasked with developing a recommended coast-wide roe fishery option and to advise the Fisheries and Oceans Canada (DFO) on specific fishery management issues. There were two HIAB meetings held in the fall of 2003. The first meeting in late September was primarily an information session in which stock status information, roe options, and management recommendations from the HTWG were presented. Stakeholder participants were then provided a period of several weeks to consult with their constituents before reconvening at the second meeting, held in the latter part of October. At the final HIAB meeting, fishing industry and First Nation representatives shared their perspectives regarding a potential roe fishery plan for 2004. HIAB members then developed a recommended coast-wide roe fishery option for 2004, which attempted to address both the commercial fishing industry and First Nation perspectives in each stock region.

Following the HIAB meetings, draft Roe Herring and Spawn on Kelp Integrated Fisheries Management Plans were distributed to interested stakeholders and all coastal First Nations (FN) for review and comment. The management plans were finalised and carried through a regional and national review process, for approval by the Minister of Fisheries and Oceans.

A final HIAB meeting was held in April of 2004 to carry out a post-season review of the 2003 / 2004 herring fisheries.

4.0. EXPECTED USE

Expected herring use for all 2004 herring fisheries is recorded in Table 2. Expected use assignments for food, social and ceremonial uses are made first followed by expected use for other commercial fisheries and test fisheries. The roe fishery receives the available balance after other assignments are satisfied. Allotments to 'non-roe' fisheries were as follows: food, social, and ceremonial fisheries – 1,535 tons; spawn on kelp – 3,000 tons (plus an additional 375 tons from minor areas); commercial communal fishery - 525 tons; winter food and bait fishery (including sport, commercial, and personal use bait, as well as Walcan and Fjord permits) –1,875 tons; charity sales - 275 tons; zoo and aquarium food - 110 tons; and Herring Conservation & Research Society (HCRS) for test fishing and research – 2,900 tons. Based on Pelagic Subcommittee advice, this left 50,969 tons for the roe fishery. HIAB subsequently approved a fishing plan of 29,455 tons for the 2004 roe fishery. Fisheries are planed so that the sum of catches from all herring fisheries in each area does not exceed the total allowable catch for that area. HIAB considered advice received from First Nations and PSARC in developing the fishing plan.

5.0. SUMMARY OF FISHERIES

5.1. Food Social and Ceremonial (FSC) Fishery

5.1.1. Queen Charlotte Islands

Monitoring of the native roe-on-kelp (k'aaw) fishery was to be conducted primarily by the Haida Fisheries Program (HFP). Fishers were requested to register with Haida Fisheries and were monitored by Aboriginal Guardians as to fishing effort and harvest.

Harvesters normally obtain most food product from Selwyn Inlet. However, changes in spawn timing in recent years has made it difficult to determine appropriate set up and harvest timing. As a result effort for personal use has decreased significantly over the past decade. Opportunities to harvest for personal use and/or for distribution within Haida communities are pursued mostly by individuals also involved in the commercial SOK fishery.

The Council of Haida Nation refrains from providing formal estimates of harvest in the k'aaw fishery each year. As a result the local resource manager provides an annual estimate of harvest based on observed inseason activities. The total amount of product harvested for food during the 2004 season is thought to be approximately 8,000 lbs, which is similar to the estimate of harvest for the 2003 season.

5.1.2. Prince Rupert District

Lax Kwalaams, Metlakatla, Kitkatla, Hartley Bay, Kitsumkalum, and Kitselas comprise the Tsimshian Nation which harvests spawn on vegetation in areas 3, 4, and 5. Local bands may also issue designations to non-Tsimshian natives to harvest within their claimed territories. The FSC allocation in the Prince Rupert area is 600 tons of herring. Harvesting takes place in the Big Bay, North Porcher, and Kitkatla areas. Harvest monitoring is usually conducted by technicians employed by the Bands.

The majority of the reported catch this year was harvested from J License operations in Area 5. Few reports were received from Area 4 but it is expected that most of the FSC product was harvested from the SOK ponds. The total FSC harvest for the Tsimshian nation this year was estimated to be similar to last year at 4,650 lbs of SOK and 1000 lbs of spawn on boughs. The harvest numbers represent only a portion of product harvested and are incomplete

5.1.3. Central Coast

Kitasoo, Oweekno (Wui'Kinuxv), Nuxalk, Gwa'sala-'Nakwaxda'xw and Heiltsuk harvested herring spawn for FSC purposes in 2004. The harvest of whole herring was not reported from Central Coast First Nations. Herring spawn was harvested as spawn on kelp, spawn on luggi, and spawn on branches.

FN harvested FSC in different ways. Kitasoo First Nations obtained FSC product as spawn on branches, spawn on luggi and spawn on kelp using both village vessels and the commercial spawn on kelp operations in the area. Oweekeno (Wui'Kinuxv) members received SOK from J-license trimmings delivered to members in the Rivers Inlet Village. Nuxalk members received SOK J-license trimmings that were brought back to Bella Coola from Illahie Inlet. Gwa'sala-'Nakwaxda'xw members obtained SOK from J-license trimmings which were delivered to the village.

In total, 27,691 lbs of spawn on branches, 5,912 lbs of spawn on luggi and 23,625 lbs of spawn on kelp were reported to have been harvested by the Kitasoo, Oweekeno (Wui'Kinuxv), Nuxalk, and Gwa'sala-'Nakwaxda'xw First Nations.

The Heiltsuk SOK allocation for food, social and ceremonial (FSC) needs is 184,000 lbs. Food fish harvest designation cards, commercial herring roe harvest designation papers and SOK fisheries registration cards were issued by the Heiltsuk Co-management office starting on March 1st, 2003. Every individual working on the grounds had to be in possession of a SOK fisheries registration card. Approximately 628 individuals were designated this season to harvest herring spawn in the Heiltsuk SOK fishery.

The area harvested this year in both the commercial and FSC herring spawn fisheries was Spiller Channel. In recent years a phone survey was used to estimate FSC harvest by the Heiltsuk following the season. In 2004 this survey was unable to estimate harvest in this fishery, primarly due to the large number of participants and the inability to obtain information from a representative cross section.

5.1.4. Strait of Georgia

A number of pre-season meetings were conducted to establish fishing plans for interested First Nations. Herring forecasts and fishing plans were discussed at the general South Island First Nations meetings in Duncan in October 2003 and January 2004. There were no specific plans put forward at these meetings, but both Saanich Tribal Fisheries (STF) and the Nanoose First Nation did express a desire to obtain herring food fish in the round. Cowichan, Chemainus, and Klahoose First Nations also indicated that they might attempt to set boughs for herring spawn.

Near the end of February 2004, Saanich Tribes again expressed an interest in receiving 1 to 2 tons of herring. In 2002 an agreement had been arranged between Canadian Fishing Co and STF to harvest herring by commercial gillnet prior to the opening of the gillnet fishery. Both parties were amenable to the same process happening in 2004.

Although Canadian Fish was willing to work with STF, events beyond the control of either party prevented this from happening. Prior to March 9th, there had been a few spot spawns, but no continued areas of spawn required for gillnetting. On the morning of March 9th, almost 20 miles of spawn was observed. The commercial gillnet fishery opened on March 10th. The fish, while abundant, were small, and the gillnet fleet had difficulty harvesting the herring. Consequently, the entire quota was not harvested. With the quick start to the commercial gillnet fishery and the fact the pools could not harvest their quota, there was no opportunity for commercial vessels to harvest any food fish prior to or after the closure of the commercial gillnet fishery.

The Nanoose First Nation was able to harvest herring in the round, as well as spawn on boughs. Herring in the round was obtained from some of the gillnet vessels fishing in the Nanoose Bay area. Boughs were also set out in the spawn. This was a low level harvest and the catch estimate is one ton of herring in the round, and one half tote of spawn on boughs.

The Cowichan, Chemainus, and Klahoose First Nations did harvest a minimal amount of roe by setting boughs, with rakes, and some diving. Cowichan dove off of Newcastle Island; Klahoose set boughs in Lambert Channel; and Chemainus used rakes near Kuleet Bay. This was also a very low level fishery, and the preliminary catch estimate for the three groups is approximately one ton in total.

5.1.5. West Coast of Vancouver Island

Prior to the season, a communication strategy was developed that included fax and email fan outs as well as the exchange of telephone/cell phone/SAT phone numbers to ensure that information about herring stocks, maturities and spawns could be quickly passed on to First Nations. In a meeting with Barkley Sound First Nations a request for seven totes (assume 1,000 lb. per tote) of whole herring was received.

Barkley Sound: The test vessel *Viking Pride* delivered 500 lbs of herring to the Ucluelet First Nation in Ucluelet, and 3,000 lbs. to Port Alberni (2,000 lb. Hupacasath, 1,000 lb. for Ditidaht). An estimated 6-7,000 lb. of spawn on boughs was harvested by Barkley Sound First Nations around March 20. No harvest was obtained from the earlier spawns. Toquaht also got about 750 lb. of trimmings from their commercial spawn on kelp operation.

Clayoquot Sound: The test fishing vessel *Royal Viking* provided approximately 350 lbs of herring to the Hesquiaht First Nation. A minimum of three full totes of spawn on branches was harvested by Ahousaht and one half tote by Hesquiaht from spawn in Baseball Bay-Hootla Kootla for a total of approximately 3,500 lbs.

Nooka-Esperanza: The test vessel *Viking Joy* provided 1,000 lbs of herring to Nuchatlaht (Oclucje), 200 lbs to Ehattesaht (Queens Cove) and 600 lbs to Mowachaht (Friendly Cove). No

boughs were observed set out in Esperanza this year. Ehattesaht harvested about 2,500 lbs of spawn on kelp left in the ponds from the commercial operation while Nuchatlaht harvested about 1,000 lbs. Ehattesaht also obtained about 200 lbs of spawn on kelp trimmings from their commercial spawn on kelp operation.

Kyuquot: Kyuquot obtained approximately 2,500 lbs of spawn on boughs left after the commercial ponds were harvested. It is likely that Kyuquot also received some trimmings from their commercial spawn on kelp contractor.

5.2. Roe Fishery

The commercial roe herring fisheries traditionally occur in some or all of five geographic areas corresponding to the major stock assessment regions (Figure 1). Within each of these areas, the usual practice has been to schedule different fisheries for gillnets and seines, so the entire quota within any of the five areas is rarely taken from a single site. The location and timing of fisheries is based on operational considerations, including the suitability of the fish (i.e. size and roe maturity), and accessibility to the fleet. Fishing generally takes place in late February to early March in southern BC, and mid-March to mid-April in northern BC. Opening dates and times for the commercial fishery are announced on the fishing grounds as the roe matures to optimum quality. Specific fishing locations are determined by major concentrations of fish and the potential for the highest roe yield.

A limited entry personal herring seine (HS) or a herring gillnet (HG) license is required to participate in the roe herring fishery. At this time, there are 252 seine licenses and 1268 gillnet licenses eligible to participate in the roe herring fishery. The actual number of active licences varies from year to year due licence retirement requirements for vessels participating in the test fishing program (see Section 5.7), and retirement requirements of 10 First Nations spawn on kelp licences (see section 5.3). In 2004, 240 herring seine licences and 1244 herring gillnet licenses participated in the roe herring fishery.

In the past, roe herring fisheries were characterised by short intense fisheries, in which the fleet fished to the overall area quota, not to individual licence quotas. This type of fishery often exceeded area quotas due to the high capacity of the fleet to catch fish and the limited ability to obtain accurate and timely catch estimates.

To practise more risk averse management techniques, the roe herring fishery is continues to be managed under a pool fishery system initiated in 1998. In 2004, license holders were again required to pool a minimum of eight seine licenses or four gillnet licenses in order to fish. There was no maximum number of licenses in a pool. Each pool fished independently until their quota was caught. If a pool caught more than their quota, the overages were disbursed in the following priority: given to other pools of the same gear type fishing in the same area; used by test boats of the same gear type working in the area (when feasible); or relinquished to the Herring Conservation and Research Society. Overages caught by a pool in one management area could not be transferred to a pool with an underage in another management area. Additionally, overages could not be transferred between gear types. All 2004 catches (seine, gillnet, and test),

were validated at the point of landing by industry funded, designated validators hired through J.O. Thomas & Associates Ltd.

The commercial roe herring fishery is traditionally allocated approximately 75-80% of the PSARC recommended allowable catch. The 2004 roe quota of 29,455 tons was 48 % of the PSARC recommended allowable catch and represented 77 % of the total expected catch for all herring fisheries. (The 2004 quota was up from the 2003 quota of 27,800 tons.) The roe quota was split between the seine and gillnet gear sectors, with the seine sector receiving 55% (16,200 tons), and gillnets receiving 45% (13,255 tons). Total roe herring catch for all areas was 24,251 tons (15,631 tons caught by seine and 8,620 tons caught by gillnet). TAC was achieved for all areas in the seine fishery with the exception of the Strait of Georgia (Table 3). The gillnet fishery was short of their TAC in all areas in 2004. Information on quotas, catch, opening dates, and open areas can be found in the fishery notice in Table 3. Additional information on seine and gillnet quotas, catches, and number of licenses by license area are presented in Table 4.

All known spawnings in 2004 are presented by location, statistical area, date and survey method (i.e. surface or dive) in Table 5. The spawn area index, or S.A.I. provides an index of abundance and is calculated by multiplying the length and width of the spawn by the percent of the area covered with eggs by the average number of egg layers.

5.2.1. Queen Charlotte Islands

Seine fishery
There was no roe herring seine fishery in QCI in 2004

Gillnet fishery
There was no roe herring gillnet fishery in QCI in 2004

5.2.2. Prince Rupert District

Seine fishery
Twenty six licenses (26) in two pools selected to fish the seine catch target of 1,500 tons resulting in a per license share of 57.69 tons. In addition, charter payment for the Prince Rupert area charter vessels and two additional charters would also be taken from the area for a target catch of 497 tons for charter payment. It was determined preseason that the test payment would be taken with the pools.

Assessment operations in the Kitkatla area commenced March 8 with the arrival of the *CCGV Kitimat II.*, followed by the test vessel *Pacific Skye* on March 10.

Fish stocks in the area did not show well during the first week of assessments. The first test sets were obtained March 17 at the Gravel Pit and Kitkatla Creek areas resulting in average sizes of 21.1 cm. and 20.9 cm, and roe yields of 1.8% and 1.6 %, respectively. The estimated tonnage at this time was 1500+ tons. On March 19 a sample was obtained off of Robert Island at 6% and on the following day at 7.5%. Stocks remained at about 2000 tons.

On March 20, stocks on began to show on the East side of Gurd Island with an estimated 2000 tons located between Gurd Point and Dries Inlet. These fish tested at 10.5% with an average length of 20.4 cm. Pool captains were notified that there would be an advisors meeting the following day.

Stocks were sampled on the East side of Gurd on the morning of March 21 resulting in a test of 12.2% with an average of five #2s and eight #3s, and an average length of 20.6cm. An advisors meeting was held at 15:00 at the Prince Rupert DFO office, at which time the fleet decided to proceed to Kitkatla Inlet and set up for a possible fishing opportunity in the morning.

On the morning of March 22 assessment vessels were unable to locate any significant schools and a spawn was underway in the Dries Inlet area. Assessments continued throughout the day, and the test vessel *Western Warrior* was brought down from Area 4 for additional support. Over the next few days no significant tonnages were located and test sets resulted in fish of small size mixed with large numbers of spawned out fish.

On the afternoon of March 26 an estimated 2000 tons was located in Willis Bay, and tested at 11.75% with an average length of 19.4 cm. Stocks were then located on the East side of Gurd Island estimated at 2000+ tons and tested at 12.9%. Following discussions with industry and concerns regarding an approaching storm front, it was decided by all to take advantage of the fishing opportunity. At 13:35 March 27 sub areas 5-4, 5-5, and portions of 5-6, 5-7, and 5-8 opened to roe herring seine fishing. The fishery proceeded at a steady pace and closed at 22:00 with a catch of 1292 tons. As storm force winds continued the following day the fleet remained anchored at the top of Gurd Island. Although winds remained strong on the March 29 the area reopened at 07:40 to catch the balance of the pool and test fish for the area. An additional 517 tons were caught and the area closed at 16:30. The remaining charter payment was caught the next day by the test vessels *Pacific Skye* and *Western Warrior*.

Total catch for Kitkatla Inlet including both pool and HCRS test fish payment was 2,104 tons.

Gillnet fishery:

After area selection 227 gill net licences were issued for the 3,000 ton Prince Rupert gillnet fishery resulting in a per license share of 13.22 tons .

Stock assessment commenced March 09 from the gill net charter vessel *Royal Pride* and March 10 with the seine charter vessel *Western Warrior*. Early in the season herring were found in the depth range of 40 to 70 fathom in the area extending from Digby Island to Parkin Islets. As the season progressed the concentration of fish moved southward and progressing towards shallower water. Peak sounding for the year was approximately 6,200 tons on March 16.

On March 17 a seine test set, 2.2 miles west of Burnt Cliff Island in 45 fathoms had a roe maturity of 4.9% (5.2% adjusted 50/50 male to female ratio). Big Bay was sounded and the beaches inspected from Big Bay down to Duncan Bay but no fish were found. Soundings indicated substantial quantities of herring in deeper water.

On the morning of the March 18, bird activity in Big Bay had increased substantially and in the afternoon, the gillnet charter skiff made a set on a 20 ton school in the shallows at Tree Bluff for a roe test of 12.75%. The estimated tonnage in the immediate area was 50 tons. At this time the fishing fleet was still in Esperanza and the Strait of Georgia hoping for further openings needed to take the quota. Pool captains and companies are contacted by phone and updated on developments in the Prince Rupert area. By the evening, soundings estimated about 800 tons in Big Bay and 1000 tons in the shallows around Tree Bluff.

In the morning of March 19 a flight of the area revealed a mile of spawn at Tree Bluff, a good showing of fish outside the spawn, and fish along the beach from Tree Bluff to Simpson Point in Big Bay. Schools of fish were also present in the shallows of Duncan Bay and Ryan Point. An advisory meeting was called in Prince Rupert at 3 pm. Not many advisors are at the meeting as most were still not in the area. The advisors that phoned in and those present at the meeting all felt the fishery should start as soon as possible.

At 8 pm March 19, the fishery opened in sub-areas 4-5, 4-6, 4-7, 4-8, 4-9 and 4-14 until further notice. At the time of the opening only 2 punts were in the area. By the following morning six punts were operating (all in the Tree Bluff area) for a catch over night of 100 tons. The main fleet started to arrive in the late afternoon and by night fall approximately 20 punts were operating, all in the Tree Bluff and Trenham Pt. area. By the evening of March 20, a total of 200 tons had been taken.

In the morning of March 21, 40 punts were fishing and hails indicated 500 tons had been taken. Most of the gear was still fishing between Trenham Pt. and Slippery Rock, although some gear had moved into Big Bay as far as Simpson Point and 3 punts were fishing in Duncan Bay. By the afternoon 55 punts were fishing and 800 tons had been taken. By the evening 24 punts were fishing in Big Bay from Trenham Point eastward into Salmon Bight, 9 punts were south of Tree Bluff. The total catch prior to night fall was estimated at 1,300 tons.

On the morning of March 22 the catch was estimated at 1,550 tons. The fleet was spread from the north shore of Big Bay all the way down to Duncan Bay. The largest number of punts, 20 were working in Duncan Bay, 7 punts between Ryan Point and Slippery Rock, 7 from Slippery Rock to Tree Bluff, 6 on the south shore of Big Bay and 8 on the north shore for a total of 48 punts. The active spawn included all of Duncan Bay extending continuously northward to the head of Big Bay with the only significant break between Ryan Point and Swamp Island. Spot spawns were also located at Shattock Point on the north shore of Big Bay. The Tree Bluff spawn was now fairly weak and washed out. Total active spawning area was in excess of 12 miles. By the evening total catch was estimated at 1,850 tons.

By the morning of March 23, catch was estimated at over 1,900 tons. The fleet remained well spread out with 5 punts working just south of the bar between Metlakatla Bay and Duncan Bay, 15 in Duncan Bay, 7 just south of Slippery Rock, 5 on the south shore of Big Bay, 11 on the north shore and 5 punts in Pearl harbour for a total of 48 punts. Spawn had started in Pearl Harbour, and the north shore of Big Bay, and the spawn from Salmon Bight along the shore to Ryan point was very broken and washed out. A good spawn remained at Ryan Point, and spawn

was active on most of the north end of Tugwell Island and in Metlakatla Bay just south of the bar. By night fall the estimated catch was 2,100 tons.

Very little fish was caught over night, a factor of declining fish in the shallows and tired crews. However the morning of the March 24, 22 punts remained in the Tugwell Island/Duncan Bay area, 9 between Ryan Point and Swamp Island and 5 in Pearl Harbour for a total of 36 punts. The only area of active spawn was on the north end of Tugwell Island, Pearl Harbour, Burnt Cliff Island and Haycock Island areas. By the end of the day the estimated catch was 2,240 tons and the fleet had all moved to Duncan Bay.

By the morning of the March 25, the total catch was approximately 2300 tons. The fleet was no longer actively fishing although nets remained in the water in the Duncan Bay and the Swamp Island area. A company plane reported a fair number of fish in the shallows on the north shore of Big Bay and in Pearl Harbour. A dozen punts moved back into that area but fishing was very spotty and generally poor. At 1400, it was announced that the fishery would closed until further notice at 1800 hours. Estimated total to date catch was between 2300 and 2400 tons, validated later at 2331 tons. Assessment of the area continued until April 05 when it was announced that the area was closed for the balance.

5.2.3. Central Coast

Seine Fishery

Fourty three (43) licenses selected to fish the target catch of 2,500 tons in the Central Coast in 2004, resulting in a per license share of 58.14 tons Licenses were arranged into three pools.
On March 2, the test vessel *Kynoc* and Canadian Coast Guard Vessel *Sooke Post* begin assessments in the Central Coast Area. Test vessels *Lasqueti Star* and *Christav* arrive on the grounds on March 9, with the *Lasqueti Star* working in Seaforth/Spiller and the *Christav* concentrating in Kitasu Bay.

A meeting with Heiltsuk Band Council members, hereditary chiefs and representatives was call ed for March 18 at the Heiltsuk Council Chambers in Bella Bella. The Heiltsuk representatives reaffirmed their position on: their opposition of a commercial fishery in Areas 6, 7 and 8; their small and inadequate commercial communal quota; and the overall management of herring in British Columbia. During the meeting it was stated that the Heiltsuk people would not allow a commercial fishery to take place in the Central Coast in 2004. After the meeting the Fisheries and Oceans representatives were met by 250-300 demonstrators outside of the council chambers who expressed their opposition to roe herring seine fisheries on the Central Coast and followed the Fishery Managers to the government dock as they prepared to depart.

On the following day a test set with fish tested at 10.0%, 19.7 cm, was made by the *Kynoc* in Spiller Channel off the Tankeeah River, Seine advisors were contacted and a tentative meeting was set for Shearwater on March 22 onboard the Lasqueti Star. The "advance notice" was put in effect for seines fishing in the Central Coast.

The seine advisory meeting was held on board the Lasqueti Star in Shearwater at 2:00 pm on March 22 with industry, pool captains and representatives from the Native Brotherhood. After

reviewing stock status and test set information it was decided that the focus for assessment for the upcoming fishery would be on East Higgins Pass and the Seaforth/Spiller Channel areas. This decision was made because both areas showed significant tonnage of herring; herring maturity in both areas was near percentages acceptable by industry; and the average size was largest in these two areas. Industry, pool captains, and Native Brotherhood members were also informed that their presence had been requested along with DFO personnel at a meeting with, Heiltsuk Band Council members, hereditary chiefs and others to discuss what would happen if there were a fishery in Heiltsuk traditional territory. The meeting was scheduled for 2:30 pm at the United Church in Bella Bella. All representatives at the Shearwater meeting felt that the upcoming meeting in Bella Bella could prove to be valuable in providing some solution for the upcoming fishery.

The meeting at the United Church in Bella Bella was attended by approximately 250 Heiltsuk and community members, Fisheries personnel, industry representatives, commercial seine fishers and representatives from the Native Brotherhood. Heiltsuk representatives restated their position that there would be no commercial herring fishery in their traditional territory, and protestors would meet the fleet on the grounds and would stop the fishery. The parties could not find grounds to resolve their disparate views.

On March 23, two test sets were made in Seaforth Channel and two test sets were made in Spiller Channel. The first sets were made in Seaforth Channel Wooton Island Area and resulted in an average roe yield of 12.8% and 19.6cm fish for set one and 16.3% and 20.5cm fish for set two. Two sets were also made in Spiller Channel at Shingle Rock which resulted in 9.6% and 18.9cm fish for set one and 12.7% and 19.7cm for set two. The Heltsiuk protest vessel Kwiahwaah arrived in the Seaforth/Spiller area and advised Heiltsuk fishermen that they would be notified when the fishery was going to occur. Heiltsuk members were encouraged to patrol the grounds and use the Kwiahwaah as a base station. Test set samples were made available to industry representatives after test sets.

Industry and pool captains attended a second meeting with Heiltsuk representatives at Shearwater at 6:30 pm to see if there was any common ground by which they could diffuse the upcoming conflict. No complete solutions were found, although it was agreed by both parties to consider fisheries in multiple areas.

The second seine advisory meeting with industry and pool captains on board the Lasqueti Star was held at 10:30 pm. Pool captains and industry again reviewed the most current stock status and test set information and recommended that a fishery could be underway as soon as possible in the Seaforth/Spiller area. Industry also wanted assessment to continue in East Higgins Pass as per their meeting with the Heiltsuk representatives earlier.

In East Higgins Pass the fishery manager reported that the fish were not showing well and he identified no fishing opportunity for the day. It was decided that after soundings, a meeting should occur at 7:00 am in the morning to assess the potential for a fishery to commence at 0800 hours.

The third seine advisory meeting with industry and pool captains on board the Lasqueti Star was held at 7:00 am March 24. Participants reviewed the early morning soundings and the updated weather forecast and agreed that the fishery should open in the Spiller/Seaforth area at 0800 hours. For the East Higgins Pass area weather was poor and no fishing opportunity was identified by the fishery manager in the area.

At 07:45 the seine roe herring fleet was informed (on channels 78A and 2318 SSB) that industry has looked at the quality of the fish from the latest test set from the Seaforth/Spiller area and found the roe quality acceptable, and that the fishery was scheduled to open at 0800 hours. Monitoring would continue in the East Higgins Pass area as the area was still under consideration for a potential split fishery.

At 0800 March 24, the seine fishery opened in the Seaforth/Spiller areas described as: Subarea 7-13, a portion of Subarea 7-12 and a portion of Subarea 7-8 which included Spiller Channel as far north as Mosquito Bay. The eastern boundary of Seaforth Channel ran from Idol Point to Hyndman Reef to Grief Island to Yeo Island. The western boundary was from the east side of Gale Pass to Fisher Point and Berry Inlet was closed at the narrows at the entrance.

The Heiltsuk protested the fishery throughout the day of the fishery using the Kwiahawa as a protest platform, with an additional 18 large vessels and 35 punts, skiffs and speedboats. The punts, skiffs and speedboats were used to try and interrupt sets by getting into sets before the net was closed up. These small vessels got tangled in several nets and had to be cut out. Additionally, seal bombs were used to try and scatter schooled herring to make them less available to the seine fishery.

By 1800 hailed catch was approximately 1,072 tons, with six nets in the water. The fishery continued throughout the night with approximately 25% of the quota still to be taken by midnight.

During the fishery, there appeared to be three different bodies of fish were located at Image Island, Spiller Ch, and Seaforth Ch. The sets in the Seaforth area (from Bullen Rock west to Fisher Point) reported fish in the 19.8-20.0 plus cm. range with a roe percentage as high as 14%. Fish in the Spiller area (Bullen Rock North to Mosquito Bay) were reported to be in the 19.7-19.9 plus cm range with a roe percentage as high as 13%. In the Image Island area (East of the Foote Islets, between Image Island and Hyndman Reef) there were three sets let go because the captains reported either mixed fish or smaller fish, after which there were no further sets made in the area.

The seine fishery in the Central Coast closed for the season at 0700 March 25 with a hailed catch of 2,450 tons. The final validated catch for the 2004 season was 2,559 tons.

5.2.4. Strait of Georgia

In-season assessments indicate stock abundance in St. of Georgia continued to be strong, although somewhat reduced from 2003.

Seine Fishery:
One hundred nineteen (119) licenses selected to fish the seine target catch of 8,700 tons. This resulted in a per license share of 73.11 tons.

It is significant that in 2004, no body of fish came into and stayed in Baynes Sound and that 2004 was the first time in 12 years that the seine fishery did not occur in Baynes Sound. At the first on-grounds seine advisors meeting on March 4, DFO discussed forming an industry pool if a large body of mature fish did not materialize. On the morning of March 9, there was 15.5 miles of spawn, and it appeared that there would be difficulty finding enough good fish to open the area for all 9 pools. DFO proposed a "one industry pool" scenario because it would allow for the management of a fair harvest of smaller quantities of good quality fish if spawning continued and a larger body of fish didn't materialize. The industry was not prepared to form one pool, but did agree to organize into three pools.

On the morning of March 10, there were 14 miles of spawn in Area 14 and an additional 2.5 miles in Area 17. Samples were collected in Baynes Sound, but quality was not acceptable to industry. Five to 10,000 tons were located and tested in Nanoose Bay and these fish were found to be acceptable to industry, and the seine fishery opened at 12:47 in Nanoose Bay, with the industry fishing in three 'super pools'.

Fishing occurred for four days between Nanoose and Northumberland Channel. One hundred and forty-three (143) sets were made in total, which is more than double the number of sets made in 2003. Eighty-six (86) of those sets caught fish, and 17 sets released approx 500 tons of fish. There were few really large sets this year, with most sets in the 50 to 150 ton range. Twenty-five (25) of the 85 licensed vessels never set this year. Some vessels licensed for the Gulf were on the West Coast; at least seven licenses were put onto vessels not capable of setting because they were not seine boats or had no nets onboard. Some of the vessels that did set were fishing gillnets as well, which resulted in less catching power. Some licensed vessels only had two crew members onboard, which meant they had to get crew off another boat before they could set. There was good cooperation and communication with industry when requesting and releasing sets.

The final validated catch for the Strait of Georgia seine fishery was 7,737 tons which was 963 tons short of the target catch.

Gillnet Fishery
Nine hundred twenty-six (926) gillnet licenses selected to fish in the Strait of Georgia, resulting in per license share of 9.78 tons given the target catch of 9,055 tons.

The first fishable amount of spawn occurred on March 9, at which time there was 15 miles of spawn around Hornby Island, and a cumulative total of 25 miles of spawn to date. Strong northwest winds made this an un-fishable day. A gillnet advisors meeting was held on March 9 and industry agreed that if spawning was continuing in fishable locations an opening would occur the following morning. The aircraft assessment on the morning of March 10 indicated that spawning was continuing, and the area opened at 08:00 hrs with 14 miles of active spawn.

On opening day, the amount of gear – approx 100 skiffs - was significantly less than in previous years. In previous years (with pool fishing), we would have expected to see 160 to 185 punts fishing at opening time. The best fishing was in the Nanoose area on opening day, however, most of the fleet was in Cape Lazo early on the first day. Shaking was light from the start and medium shakes were rarely reported or observed

The fishing area was expanded to include Area 17 South on Sunday March 14, and Areas 14 and 17 North closed on the morning of Monday March 15. All areas were closed at 18:00 on March 15. Portions of Area 17 South and all of Area 18 re-opened at 20:00 Saturday March 20. The area below Dodd's Narrows remained open for almost 9 days, with approx 500 tons caught by 10 pools.

The fishery closed for the balance of the season at 16:00 hrs March 29. The gillnet fishery was open for 16 days in total and the validated catch was 5,637 tons, or 62% of the 9,055 ton quota, was caught. None of the pools achieved their quota.

5.2.5. West Coast of Vancouver Island

Seine Fishery
Fifty-two (52) licences participated in the 2004 seine fishery, with a target quota of 3,500 tons. The per licence share was 67.31 tons.

In 2004, both Areas 23 and 25 were considered for possible seine fisheries dependant on adequate stocks in each area. Thus, both areas were assessed with the consideration of a potential fishery in either, or possibly both areas. The test fishing vessel *Viking Pride* commenced the stock assessment program in Area 23 on February 23, assisted by the test fishing vessel *Free to Wander* which began on March 1. The stock assessment program in Area 25 started on February 27 with the test fishing vessel *Viking Joy*. . By March 1, tonnage estimates for Area 25 were 20,000 tons and on March 6 the *Free to Wander* arrived in Esperanza Inlet which would become the focal point for the seine fishery due to the relative soundings between Barkley Sound and Esperanza Inlet.

The charter vessel *Viking Joy* estimated 20,000 tons of herring in Esperanza Inlet by March 1 and these stocks remained in the area until the major spawn commencing on March 15. Throughout this period the main body of herring were located from Garden Point out to Middle Reef. Roe tests and samples collected revealed a consistent and steady increase in roe maturity throughout the two weeks preceding the fishery. Test information also revealed that the main body of fish was comprised of relatively large fish in comparison to fish tested in Barkley Sound and Clayoquot Sound.

An industry advisory meeting was held in Zeballos on March 12 at 11:00 where the following topics were discussed:

- Test sets and soundings
- Test fish payment
- Roe quality and fish size

- Fish behaviour
- Fishery considerations: area, date time
- Number of first sets
- Other fisheries: SOK, FSC

After receiving information and opinions from industry reps, it was agreed that the fishery would be held Sunday March 14. Charter vessels assisted by four industry vessels sounded subarea 25-13 commencing at 05:30 March 14 to determine the location of the major body of fish. Depending on where the fish were located, two possible fishery scenarios had been previously agreed upon. If the fish were found in the area of Center Island, a fishery would commence at 07:00. If the fish were located seaward of Rosa Harbour, the fishery would commence at 11:00 to correspond with the time of tide change.

The fishery opened at 11:00, Sunday March 14 and continued until 16:09, Monday March 15. There were 11 sets made in the first hour, eight of which hailed an estimated catch of 938 tons. Generally the largest sets were made in the first three hours of the fishery, and by 18:00 March 14, catch was estimated at 2,100 tons. The fishery continued throughout the night for the two largest pools, with the last sets being made approximately 09:30 Monday morning. In total, 58 sets were made with 41 catching fish. The largest set was hailed at 340 tons.

Gillnet Fishery

Ninety-one (91) gillnet licences in seven pools participated in the WCVI gillnet roe herring fishery with a target quota of 1,200 tons and a per license share of 13.19 tons.

Stock assessments began on Feb 26 in Nootka Sound and February 27 in Esperanza Inlet. Initial soundings in Esperanza located 10,000 tons in two large concentrations off the west end of Center Island. Roe testing indicated a maturity of 0.62% and an average size of 20.83cm. By March 1 the tonnage estimate for Esperanza had increased to a peak sounding of 20,000 tons and remained at this level until the fishery took place on March 14. The fish were difficult to assess because they were concentrated on the bottom throughout the day in large dense schools. It was not until just before the fishery that the fish started breaking up into smaller schools and moving around the inlet.

On March 9, a test set off Flower Island indicated a roe maturity of 11.75%. This test was high to females but translated into 10.7% on a 50/50 male to female ratio. Based on this test, the 48 hour notice was put into effect. This meant the fishery could take place anytime after Thursday, March 11.

After the 48 hour notice was put on, a few more gillnet punts moved into the area. However, because the gillnet fishery in the Strait of Georgia was still open, most of the fleet was still there. For this reason there was no on-grounds gillnet advisors meeting. Each gillnet pool captain was contacted by telephone and the rules governing any potential gillnet fishery were reviewed. This included the trigger for an opening, which would be a request by any one pool to start fishing. Boundaries to protect FSC and SOK fishing areas were also reviewed with each pool captain.

On the morning of March 14 the seine fishery opened at 11:00 in Esperanza. In addition, the test boats were also attempting to catch their payment requirement. At 11:30 March 14, one of the gillnet pool captains reported a spawn at Ensanada Island that was expanding and requested the area to be opened for gillnet fishing. A meeting was quickly set up with three of the five gillnet pools that were in the area to review the closed areas for the gillnet fishery, and copies of charts showing the closed areas were given to each pool captain. The gillnet fishery opened at 13:00 March 14.

Fishing was very slow with only three nets in the water at opening time. Several pools did not fish the first day and but the time they started on March 15, the spawn in Outer Nuchatlitz had stopped completely. One of the pools did not have their gillnet decals so they could not fish until the second day of fishing. Another pool elected not to fish on the first day because they did not arrive in the area until late in the afternoon. On the morning of March 15, the first packer left the grounds with a hailed catch of 64 tons. By 11:30 March 15, there were 24 nets fishing in inner Nuchatlitz and shaking was light to medium. Fishing continued throughout the day and night with most shakes being light to medium. On the morning of March 16, there were only 20 nets in the water and the total hailed catch was 329 tons. All fishing was taking place in the Inner Nuchatlitz area. During the previous night punts had reported an average of 2 tons per shake with 3 hour soaks. By the late afternoon of March 16, the hailed catch was 495 tons and this increased to 596 by 19:30 that evening.

On March 17 a light spawn was reported along the east shore of Roasa Island and at 10:55 an announcement was made opening this area for gillnet fishing. Roasa Harbour had been closed in order to minimize conflicts with the SOK operations set up there. Prior to opening this portion of Rosa Harbour, discussions were held with the SOK operator and a local First Nation representative. They did not feel there would be any conflict with either the SOK or FSC harvests. Only a few nets were cast into the light spawn along the east shore of Rosa Island, which resulted in little catch from the area. By late afternoon virtually all of the spawn had stopped and there was no one fishing. The area remained open until March 19 when it was decided to close until further notice.

Spawn flights were carried out daily in Esperanza Inlet and Nootka Sound, but there were never any further opportunities for gillnetters in the area to catch the remaining quota.

Esperanza Inlet closed for the balance of the season at 12:00 March 26, with a final validated catch of 653.932 tons, which was a shortage of 546 tons.

5.3. Spawn on Kelp Fishery

Spawn on kelp (SOK) fisheries generally take place in March and April, with fisheries progressing in-season from south to north. In some years, fishing will persist into May and June in more northerly locations. The fishery generally is carried out at specific locations where there are adequate herring spawns, and the herring are accessible to ponding operations.

The 2004 commercial SOK fishery occurred in 4 of 5 geographic areas corresponding to the major stock assessment regions (Figure 1): Queen Charlotte Islands (Area 2E); Prince Rupert (Areas 3,4,5); Central Coast (Areas 6,7,8); and West Coast of Vancouver Island (Areas 23, 24,

25). In addition, some licences operated in locations supporting minor herring stocks, including Quatsino Sound (Area 27), Johnstone St. (Area 12), and Smith Inlet (Area 10). A restricted management regime was initiated in the Queen Charlotte Islands due to stock concerns in 2003 was continued at the request of the local community members and the local area manager even though increased stock strengths had been forecast for the area.

During the annual herring planning process, herring was allocated from the TAC for the spawn on kelp fisheries. This allotment is to allow for the average per-license production of 8 tons of spawn on kelp product. Mortality and egg loss is considered in the formula used to calculate the requirement of 100 tons of herring per closed pond operation and 35 tons per open pond. In 2004, 1,000 tons of herring were allocated in both the Prince Rupert and QCI areas, 600 tons in the Central Coast, and 400 tons in the WCVI area. An additional 375 tons was allocated from the minor stock assessment areas and 525 tons in the Central Coast for Heiltsuk commercial communal spawn on kelp fisheries. This allocation allowed for 2004 a commercial spawn on kelp coastwide quota of 414.444 tons of product.

Forty-six (46) category "J" and "FJ" licenses were issued to harvest herring spawn on kelp in 2004. The majority of licence holders in this fishery are First Nation individuals or tribal groups (37 of 46 licences). Individual quotas (IQ) are specified on each licence. In 2004, individual quotas were based on 8 tons of drained product and subject to the quota carry over provisions. Exceptions to the 8 ton catch allocation exist for Native band licences which have not met roe herring licence retirement provisions[2], and for three Heltsiuk licenses (FJ-1, FJ-39, and FJ-41) which each have a quota of 24 tons (48,000 lbs.).

A quota carry-over program introduced in 1996 was continued in 2004. This program allows spawn on kelp licence holders to carry over reasonable IQ overages or underages, from one year to the next. The rules for carry over are as follows:

- Licence holders whose product weight at the end of the season is under the IQ by 2000 lbs. or less will have the equivalent weight of the underage added to their IQ in the following year.
- Licence holders whose product weight at the end of the season is under the IQ by more than 2000 lbs. will have 2000 lbs. added to their IQ in the following year and will forego the remainder.
- Licence holders whose product weight at the end of the season is over the IQ by as much as 1000 lbs. may retain the overage, and the equivalent weight of the overage will be subtracted from the licence holder's IQ in the following year.
- Licence holders whose product weight at the end of the season is over the IQ by more than 1000 lbs. may retain 1000 lbs. of the overage, and must relinquish the remainder to the SOKOA. Further, the weight of the total overage will be subtracted from the licence holder's IQ in the following year.

[2] The 10 FN band licenses introduced in 1991 and 1992 are each required to designate 4 gillnet licenses as inactive in a given year, unless they have permanently retired the licenses. If a license does not retire all 4 licenses, their SOK quota is prorated.

The weight of the spawn on kelp product to be applied against an IQ is the total drained weight of spawn on kelp product validated at the landing port. A salt allowance, equal to 5% of the total drained weight, is applied to compensate for salt and entrained water (i.e., the total validated weight will equal the drained weight minus 5% of the drained weight).

The transfer of SOK product between licence holders operating in different stock assessment regions is not allowed. Spawn on kelp product can be transferred on-grounds between licence holders in the same stock assessment region. In-plant transfers of product between licence holders from the same stock assessment area can be carried out subject to the prior approval of a Fisheries and Oceans representative.

The Spawn on Kelp Monitoring Program (SOKMP), introduced in 1996 continued for the ninth consecutive year in 2003. This program was managed through the Spawn on Kelp Operators Association (SOKOA) via contract with JO Thomas and Associates, but received funding for the on-grounds portion of the program from the Herring Conservation and Research Society (HCRS) in 2004. The objectives of this program are to monitor aspects of the fishery using on-ground monitors and port validators. On-ground monitors document fishing and harvest activities of each SOK operation. Port validators validate the landed harvest with records from the on-ground monitor and record final landed weights. Port validators also monitor in-plant transfers of both processed and unprocessed product between licenses and audit the utilisation of J-license export buckets and bucket decals during processing.

On-grounds monitoring was provided through the assignment of ten monitors coastwide. A total of 227 monitoring days were expended during the 2004 fishery. In QCI, one monitor provided coverage for the 10 J licenses operating in area 2E. Two monitors worked in the North coast to provide coverage in Area 3 / 4 and Area 5. Three monitors provided on-grounds monitoring in the Central coast for 10 J licenses operating within Areas 7 to 12. Four monitors worked in the WCVI to provide coverage for operations in Areas 23, 24, 25 and 27.

The SOKMP provided coverage by eight port monitors, who were assigned to one of seven designated landing locations on the coast, and observed landings to 13 different processors. Some port monitoring requirements were completed by on-grounds monitors opportunistically. Port monitoring efforts consisted of over 800 port monitoring hours covering 70 deliveries of SOK product. Monitors validated landed harvest documented by on-grounds records, validated drained weight measurements and in-plant transfers of both processed and unprocessed product between license holders, and audited the utilisation of J-license decals and pails during processing.

The SOK coastwide landings for 2004 were 395.508 tons based on 8 ton individual license quotas adjusted according to carryovers from 2003. These landings include the 48 ton enhanced production from three Heiltsuk communal licenses. SOK landings by area can be found in Table 6. Overall, 45% of total production came from open line operations and 55% from closed ponds.

5.3.1 Queen Charlotte Islands

Due to conservation concerns a precautionary SOK management plan similar to what had been applied in 2003 was developed and approved as an appendix to the SOK IFMP for 2004.

On January 15 and February 3, 2004, conference calls with QCI SOK license holders were facilitated by the local area resource manager. The objective of these calls was to establish an early co-operative working relationship amongst the license holders and to define the groups which the operators would work co-operatively within to meet the objectives of the precautionary management plan. Because some of the license representatives could not specify operators or resources, no formal working relationships were suggested on the January 15 call. During the meeting on February 3, license holders agreed to work in 3 groups.

It is important to note that license holders recognized that the QCI spawn-on-kelp precautionary plan, as detailed in the IFMP, was voluntary. They all expressed appreciation for the importance of working together co-operatively as opposed to competitively. No contractually formal pools were formed, rather an agreement was made to work together and help each other out.

The season began in late February in Skincuttle Inlet. Difficulties in locating fish, and more favourable circumstances, as reported by the charter vessel *Queens Reach*, in Selwyn Inlet, caused the operators to relocate on March 3. Most QCI SOK operators also had roe herring interests in other areas, particularly the Strait of Georgia. Without the presence of other operators, it was difficult to work all of the early harvest opportunities that were potentially available. This situation caused some concern over lost early opportunities.

The majority of operators did not show up on QCI until after March 19. By this late date all efforts went into the only viable opportunity, which was in the Huston Inlet/Jedway Bay area of Skincuttle Inlet. Nine out of ten operators were in the area setting up a total of eight ponds, six along the west shore of Huston Inlet and two in Jedway Bay.

After the Skincuttle Inlet opportunity, five license holders still required product to complete their harvest. As a result, four ponds were set up by operators in DeLaBeche Inlet at the beginning of April.

In general, operators were more independent than during the precautionary fishery in 2003, however, there was a better spirit of co-operation this year. Although some compromises were made to the precautionary approach, the impact of the fishery on stocks was likely similar to the 2003 season (i.e. dramatically reduced from the more competitive fisheries of the past).

In total, over the course of the season, 17 ponds were established between February 29 and April 5. Open lines were setup in all locations to varying amounts, but were only marginally successful. In past years, with no precautionary management approach, the competitiveness in the fishery often resulted in each operator setting up between three and five ponds throughout the season. There was no observed or reported mortality in any of the ponds this year.

During the 2004 roe-on-kelp season, monitoring and recording of all ponding and harvesting activities was the responsibility of the validator, but up as a subcontract to the Hiada Fisheries Program through J.O. Thomas & Associates. The validator worked from the vessel *Haida Guardian #1* throughout the season. Of the overall QCI harvest, 14% was taken at Selwyn Inlet,

47% from Huston Inlet, 32% from De la Beche Inlet and 7% from Jedway Bay. Overall, 96% of total production was taken using closed ponds and 4% harvested using open pond techniques.

5.3.2 Prince Rupert

Ten licenses operated in the north coast, with three located in Kitkatla Inlet and seven located in Area 4 in the Pearl Harbour, Big Bay, Venn Pass and Island Point areas.

In Area 4, the fishery was very protracted over time with all operations active into May, and final harvests occurring on June 2. While four of the seven licenses managed to harvest to within carry over provisions, two licenses were substantially short of achieving quota. From this area 35% of production came from Island Point, 33% from Tugwell Island and 32% from Stumaun Bay. No production came from open lines in Areas 3/4.

A total of three J licenses operated in Area 5 for the 2004 season. All three operators conducted ponding operations at the top of Gurd Island located in Kitkatla Inlet. In total 7 ponds were filled for the production of roe on kelp. Production was augmented by the placement of lines in Gurd Inlet. In total, 85% of production came from the closed ponds, while the remaining 15% was taken from open lines. All three licenses were completed by mid April with small to moderate overages.

As in recent years the availability of quality kelp was limited forcing operators to travel farther a field.

Operations were without incident this year with the exception of one vessel striking a rock while transporting the product out of Kitkatla Inlet. Fortunately the product was well secured preventing any loss.

5.3.3 Central Coast

Nineteen licenses including 9 Heiltsuk licenses operated in the Central Coast between Beaver Harbour in Area 12 and Kitasu Bay in Area 6, including Takush Harbour, Illahie, Spiller Channel, Higgins Pass and Kitasu Bay. All licences harvested to within carry over limits, and the Heiltsuk harvested to maximum quota including carryover limits, with all product taken from Spiller Channel. In total, 72% of Central Coast productions came from open lines.

On-ground monitor coverage and in plant validation was provided by the SOKMP for all operations except the Heiltsuk communal commercial licenses. In 2001, the Heiltsuk withdrew from the SOKOA monitoring program. Therefore, as in 2003, the Heiltsuk Fisheries Program, DFO Resource Management and C&P Staff provided a separate monitoring program for these licenses. This season, the Heiltsuk guardians monitored the "on grounds" operations of the communal SOK fishery, while DFO C&P staff was present for all validations at the plant. The fishery operated using an individual quota system with each applicant issued a personal quota. Personal quotas were then combined into a harvesting crew quota. In total 108 crews comprised of over 600 harvesters were registered for the Heiltsuk SOK fishery. Any harvested SOK product that remained after the crews delivered their quota to the Bella Bella plant, was used as FSC SOK.

5.3.4 West Coast Vancouver Island

For the WCVI the Spawn on Kelp Monitoring Program involved a vessel based operator in Area 23, a land based operator in Area 24, a vessel based operator in Area 25 and a land based operator in Area 27.

Area 23

One license operated in area 23 with the main pond, converted from a fish farm, set up in the pass between the Stopper Islands. A six foot high chain link fence was put around the outer side of the boardwalk to stop sea lions from climbing over which was a problem in previous years. A "decoy" pond was also set up on the West side of the Stoppers. Herring was put in the decoy pond - the theory being that sea lions would target this unattended pond rather than the main pond which was usually attended The operator was also prepared to set up an additional pond by Bazett Island and to open pond around the Stoppers if required.

On March 6, 20 tons of herring were put in the decoy pond. On March 10, 11, 12, 13 and 14 fish was put into the main pond with kelp added on March 13. Additional kelp was added on March 14 and 15. Ten lines of kelp were also strung on March 17 near spawn at 2 locations on North and South Stopper Island. Harvesting commenced on March 18.

The initial product was weighed in Ucluelet on March 22. The remaining product was harvested on March 22 – 23 with final weighing on the March 24. Very little product was harvested from the open lines.

Area 24

Ponds were set up in Young Bay in late February/early March. A second pond was set up in Riley Cove and later moved to Baseball Bay. Several sets were made adjacent to the Young Bay site but all fish caught were not suitable, either mixtures of herring and sardines, fish too green, or too small. The test vessel *Royal Viking* did identify some larger, more mature fish in the area but at that time the operator was collecting kelp. The Young Bay pond was moved to the Openit Peninsula by March 22.

On March 22 fish were put in the Baseball Bay pond, and spawning commenced immediately. On March 24, a second pond was moved into the natural spawn. Eight totes were harvested on the March 27 and a total of 12 totes were harvested on the March 28. Further attempts to obtain remaining quota were unsuccessful.

Area 25

One frame, (ex-salmon farm), with 4 separate ponds was set up in Rosa Harbour by March 9. A log-framed "communal" pond was later put together farther in to the harbour. Kelp was put in the ponds starting on March 10 and the first fish was ponded on March 11. A total of approximately 300 tons of herring were put in the 5 ponds by March 14. There were signs of significant mortality in one pond on March 16. The fish were released and harvesting commenced on March 17 and was completed on March 20.

Area 27

In Area 27 the monitor worked off the test seine vessel *Nita Maria* while it was under contract to the HCRS in the area. The test vessel also paid for the monitor for the two week period of the test fishing charter in the area.

In 2004, all three of the regular SOK operators were again located in Area 27. For the last three years, one of the Area 27 licenses had been temporarily relocated to Area 25 due to stock concerns in area 27. An estimated 943 tons of herring spawned in Area 27 in 2003. The harvest policy for minor stocks allow up to 10% of the previous year's biomass to be harvested in the following year. For 3 open ponds a total of 105 tons are required (3*35) and it was felt that the stocks could handle the 3 operations.

Ponds were located in the normal locations on the East side of Winter Harbour. Fish first moved in to Winter Harbour on March 8. Spot spawns began on March 12, which developed into the major spawn the next day and continued until March 18. Harvesting started on March 16 and was completed by the March 19. All operators harvested to within the allowable limits.

Finding adequate supplies of good quality kelp did not appear to be an issue this year. Kelp was harvested in Areas 23, 25, 26 and 27. Some re-kelping was required, particularly in the Area 24 operation.

5.4. Winter Food and Bait Fishery

The winter food and bait fishery normally takes place in the Strait of Georgia between November and early January when the fat content of the fish is the highest. This fishery is intended to supply a small amount of fish for secondary processing for food as well as meet some of the frozen sports bait and commercial bait requirements. The demand for this type of product has been relatively small for the past several years and the Total Allowable Catch (TAC) has been set at 900 short tons.

This fishery is licensed under the "ZM" category and vessels are selected on an annual basis through a lottery draw. In order to qualify for the lottery a vessel must have a history of either fishing roe herring under a "HS" category licence, or a Spawn on Kelp, "J" licence designation sometime within the past five years. In 2003, license designation rules were changed such that the "ZM" license eligibilities drawn in the lottery could be designated to any vessel meeting the vessel requirements. Additionally, a maximum of four ZM licenses could be designated to any one vessel. Prior to license issuance vessels are required to demonstrate that they meet stability requirements under the Canada Shipping Act.

Observers are required to be on board the fishing vessel at all times when the vessel is catching or transporting herring. In addition a dockside monitor is required to validate offloading of the catch.

In 2003 the total quota was 900 tons and was broken down into 18 individual 50 ton quotas. Under the authority of the new licensing system, five licenses were designated to vessels not drawn in the lottery, and one vessel fished two licenses.

The fishery was opened on November 2 but no fishing took place until November 25. A total of 731.1 tons was landed between November 25 and January 22. Of the total landings, 548.8 tons was caught in Area 14 between French Creek and Little Qualicum and 182.3 tons was caught in Area 17 in the general area of Nanoose Bay. At the end of the season, 15 of the 18 licenses were fished, which was an increased level of participation from previous years.

5.5. Special Use Fishery

The special use herring fishery provides opportunities to utilise herring in alternative ways to the mainstream herring fisheries. Herring are caught for use as commercial sport bait; personal-use commercial bait; food, charity sales, zoo and aquarium food, and commercial bait sales.

A ZX or ZY licence is required to participate in the fishery, and a commercially licensed vessel is required for harvesting catch. Herring caught for personal-use commercial bait require a one ton ZX licence. A 3-ton ZY licence is required if the herring are caught for sale. A limit of five active 3-ton ZY licenses can be designated to a catcher vessel at any given time. License holders can be re-issued another license in the same license year provided they can demonstrate the current license allocation of herring has been utilised (i.e. by submitting a completed landing report).

The allocations for the special use fishery are in addition to the fall food and bait lottery fishery. In 2003, the coastwide allocation for special use fisheries was 1160 tons. The breakdown was as follows: 20 tons commercial bait sales; 500 tons sports bait sales (which includes Walcan's 300 ton licence); 55 tons for personal use bait; 200 tons for food (i.e. Fjord licence); 275 tons for charity sales; and 110 tons for zoos and aquariums (Table 7).

There were 19 ZX and 46 ZY licences granted in 2003. Preliminary landing for the 2003 special use fishery license year was 768.0 tons, including landings from Fjord and Walcan licenses.

5.6. Herring Conservation and Research Society

At the 1995 fall HIAB meeting, Department of Fisheries and Oceans (DFO) and industry representatives discussed and agreed to the formation of a non-profit organisation, the Herring Conservation & Research Society of BC (HCRS). The role of the Society is to support research that addresses the need for knowledge and understanding of herring biology and the factors that affect fluctuations in abundance. The goal of the HCRS is to assist DFO in developing the tools necessary for ensuring precautionary and risk averse management of the herring resource.

In the fall of 1996, the HCRS entered partnering arrangements with DFO related to fisheries management when the HCRS assumed responsibility for the test fishing program. The Society was given an allocation of fish to use to conduct the test fishing program. This allocation was determined by HIAB, in conjunction with DFO, and was included in the 1996/97 TAC. A portion of the roe herring TAC has been allocated to the HCRS to carry out test fishing activities

in each subsequent year. The HCRS conducted test fishing activities for the eighth year in 2004[3].

A significant development in 2002 was the formation and implementation of an HCRS Science Review Panel. The purpose of the Panel is to conduct an annual independent review and evaluation of all research proposals submitted to the HCRS, and subsequently make recommendations to the HCRS Board of Directors. The Panel also advises the Board on aspects of herring biology, and conservation as required.

Eleven science proposals were submitted to the HCRS for funding in 2003 (Section 5.6.1). In general, the Panel found the projects addressed important stock assessment issues. Ten of the 11 research proposals submitted were ultimately approved, although some of the projects were required to complete further analyses and provide additional justification prior to funding. The projects were broken down into four focus areas:

1. stock identification
2. juvenile recruitment
3. stock assessment
4. biology and ecosystem concerns

5.6.1. Research Projects:

Coded Wire tagging program

This program was designed to investigate herring stock structure and straying rates among assessment regions. Herring are tagged on the spawning grounds, herring catches are scanned as they go through detectors in the plants, and tags are recovered in the plants. In 2004 (as in 2003), a vessel was hired through the test fishing program, and 357,347 herring were tagged on the WCVI and Central Coast. A total of 1,148 tags were recovered.

Herring molecular genetics survey

The DNA study surveys variation in genetic markers in herring samples and evaluating the results to determine whether the samples have been derived from a single breeding population.

Herring have been collected from the start of the program in 1998. While the general results from the survey are of limited genetic differences among herring in BC, there are some differences. On the east coast of QCI, herring spawning in Skidegate Inlet are distinct from those spawning further south in Selwyn Inlet, Section Cove, and Skincuttle Inlet. In the St. of Georgia, herring spawning in Portage Inlet / Esquimalt Harbour near Victoria are very distinctive genetically. There is also some indication that herring spawning in the mainland inlets (Rivers Inlet, Knight Inlet) may be distinct from those spawning in other regions of British Columbia.

[3] See Section 5.7 Test Fishing Program

Productivity Trends in Northern BC Herring Stocks

The main objective of this project is to analyze the growth and recruitment dynamics of the three northern BC herring stocks, and to attempt to explain the causes for the observed production trends in these stocks in the 1990's. Understanding the reasons why herring production rates (measured as growth and recruitment) vary is extremely important because these variations determine how the stock biomass will change. This project addresses the management issues of stock abundance and growth trends.

An Ecosystem View of Northern Herring

The survey of juvenile and pre-recruit herring in 'northern' B.C. will provide information on their distribution, relative abundance, feeding, and level of predation north of Vancouver Island. There are two components to this project: an offshore mid-water trawl survey for recruitment forecasting and an inshore survey to understand the role of herring in a northern ecosystem.

WCVI recruitment and euphausiid productivity

A recruitment forecasting survey has been conducted annually on the WCVI since 1986. The forecasting methodology has been accepted by PSARC and is incorporated into annual WCVI forecasts. The methodology and survey information used to estimate WCVI recruitment may also be able to be used to estimate St. of Georgia recruitment.

This project also monitors euphausiid productivity and relates that information to size at age trends. A goal of the current study is to provide information on the effect of the marine ecosystem on the variation in WCVI herring recruitment during the first year of life. This addresses a key goal of DFO Science policy, which is to understand how marine ecosystem changes affect the biology of exploited fish populations

Fisheries and Tags

The work in general supports the basic management issue concerned with the population structure and dynamics of herring. The report on fishing will provide a quantitative basis for describing the spatial and temporal scale of the herring roe fishery. The report on fishing will provide a quantitative basis for describing the spatial and temporal scale of the herring roe fishery. The roe fishing report and associated database areas also will provide a basis for integrating catch data with tag data during the roe-fishery era. Such an integration will improve the interpretation of the tag recovery data and provide a basis for new analyses. The tagging 'analysis by release' project will provide a basis for quantifying and evaluating potential changes in the fidelity and straying rates - either as a function of inter-annual variation, or area-specific differences.

Herring Spawn Surveys: Supporting Research

This project has two components: the digitization of the diver transects used in spawn surveys and the production of an egg development atlas. Digitized diver transects will provide for

improved DFO data management, increased efficiency of dive surveys and substantial improvement in data security). The egg development atlas will provide a better basis for age determination of spawns and improved assessment of spawn surveys.

Juvenile Recruitment Survey in the St. of Georgia

Juvenile surveys continued in 2003, following protocols used for the last 11 years. The survey methodology was reviewed by PSARC. The most recent PSARC paper concluded that the surveys did have predictive value although the paper pointed out that the surveys were not able to anticipate the very large recruiting 1999 cohort. Although there are questions about the utility of these surveys for recruitment prediction, these surveys contribute to increased understanding of factors affecting the strength and timing of year class strengths in herring through the varitiy of data collected.

St. of Georgia Bait Herring Survey

A bait fish survey in the St. of Georgia attempted to quantify the distribution and abundance of bait fish stocks in east side of St. of Georgia, and in southern Johnstone St. Biological information as well as DNA samples were collected.

Herring dive survey video

A training video will be made for the herring dive survey program. This video will assist in standardizing assessment methods for all divers participating in the program, thereby increasing data quality.

5.7. Test Fishery

A regional herring test-fishing plan is developed for each season. The plan takes into consideration stock assessment requirements (i.e. are there enough vessels to conduct spawn surveys and to adequately sample fish stocks) and management needs. In most cases, a test fishing vessel is required to retire a license for the season (either seine or gillnet, depending on the charter) in order to participate in the test fishing program.

5.7.1. 2004 Test Fishing Program

The 2004 test fishing plan was approved by HIAB at the October 2003 meeting. The HCRS received an allocation of 2,900 tons (which included 200 tons to fund research projects) to administer the test fishing program. This allocation was part of the commercial roe herring TAC.

In total, 25 vessels participated in the 2005 test fishing program. A summary of vessels by categories, area worked and license retirement requirements are found in Table 8.

In the Queen Charlotte Islands, 3 test vessels operated. The *Ocean Horizon* worked primarily in area 2W, but also provided some seine test coverage in 2E. The *Ocean Horizon* also conducted some surface spawn surveys in Area 2W. The *Queens Reach* worked in 2E to provide seine test information and the *Haida Provider* conducted all dive surveys in the QCI area. A total of

325.72 tons of payment fish was required for test vessels operating in the QCI area. Due to predicted low stock abundance in the area, payment fish was taken from Prince Rupert, Strait of Georgia and WCVI by test vessels working in the areas.

Three vessels conducted test fishing operations in the Prince Rupert area. The *Western Warrior* provided seine test operations in Areas 3 and 4, and the *Pacific Skye* conducted seine test duties in the Kitkatla Inlet area. Gillnet test and spawn surveys for the Prince Rupert area were conducted by the *Royal Pride*. The *Royal Pride* was also used briefly as an assessment vessel for the Area 3/4 gillnet fishery. The total requirement for the Prince Rupert test vessels, including the QCI and Area 27 vessels was 480.565 tons.

In the Central Coast region, 5 vessels preformed test fishing operations in 2004. Dive surveys were conducted by the *Pachena No.1*, while seine test and dive surveys were provided by the *Christav*. Seine tests were conducted by the *Kynoc* as a full charter, and the *Ocean Venture* as a split charter with the Strait of Georgia. The *Lasqueti Star* operated as the assessment vessel. A total of 465.25 tons of payment fish was required from the Central Coast.

In the Strait of Georgia and Johnstone Strait, a total of 11 vessels participated in the test fishing program. Gillnet test and dive surveys in the Strait of Georgia were conducted by the *Thunder 1* and *Silver Viking*. In addition, the *Pachena No.1* conducted a split dive survey charter with the Central Coast with approximately the first week of the charter spent in the Strait of Georgia. Surface surveys in areas 12 and 13 were provided by the *Port Lincoln* and *Discovery Huntress*, which were both paid in dollars per day for their services. Full seine charters were conducted by *the Savage Fisher* and *Royal Mariner 1*, while the *Angela Lynn* and *Bernice C* conducted short, no license charters. The *Ocean Venture* worked a split charter between the Strait of Georgia and the Central Coast, although the majority of the charter was spent in the Strait of Georgia due to the late fishery timing. The seine assessment vessel was the *Avalon*, and the gillnet assessment vessel was the *Kristen Joye*. The *Ocean Marauder* conducted coded wire tagging operations in the WCVI and Central Coast areas, while payment fish was to come from the Gulf. Total test payment requirement for vessels operating in or receiving payment from the Strait of Georgia 921.365 tons. However, only 124.8 tons of gillnet payment fish was caught in the Strait of Georgia in 2004. St. of Georgia shortages were made up of pool and test fish overages, as well as the difference between the HCRS allocation and the test fish requirement in Prince Rupert, Central Coast, and West Coast of Vancouver Island.

On the WCVI, five vessels provided test fishing information. Dive surveys and seine test were conducted by the *Viking Joy* in Area 25 and 26 and the *Royal Viking* in Areas 24 and 23 while the *Viking Pride* conducted seine testing work in Area 23. The *Free to Wander* operated as an assessment vessel for the WCVI area. A short no license charter was done by the *Nita Maria* to provide seine test information from Area 27. Payment fish for the *Nita Maria* was taken in the Prince Rupert area. The total test payment fish required from the WCVI was 536.89 tons.

The total test fish requirement for all areas in 2004 was 2,404.75 tons and 1,969.826 tons were caught. Test fishing vessels are listed in Table 9 by area and dates of operation, bid rates, duration and final payment requirements are listed by vessel in Table 9. Test fishing requirements and catch by region, location and date are found in Table 10.

Acknowledgements

The information contained in the "Summary of Fisheries" section was provided by local area managers from reports presented at the April 2004 HIAB meeting. Charles Fort of DFO Stock Assessment provided spawn summary data presented in Table 5. Some of the information in the Spawn on Kelp section was provided by a data report prepared by JO Thomas and Associates on behalf of the SOKOA and funded by the HCRS. Additionally, Table 6 was adapted from final SOK landings provided by J.O. Thomas and Associates on behalf of SOKOA.

References

Schweigert, J. 2003. Stock assessment for British Columbia herring in 2003 and forecasts of the potential catch in 2004. Canadian Science Advisory Secretariat Research Document 2004/005:102p.

Schweigert, J.F. and D. Ware. 1995. Review of the biological basis for BC herring stock harvest rates and conservation levels. PSARC Working Paper H95: 2.

PSARC. 2003. Proceedings of the PSARC Pelagic Subcommittee Meeting, September 3, 2003. Canadian Science Advisory Secretariat Proceedings Series 2003/026. http://www.dfo-mpo.gc.ca/csas/Csas/Proceedings/2003/PRO2003_026_E.pdf

Table 1. 2004 Forecast biomass (tons), recruitment assumption, and recommended yield by region.

Region	Cut-off Biomass (tons)	Recruitment Assumption	Observed Recruitment	Forecast Biomass* (tons)	Recommended Yield (tons)
Queen Charlotte Islands	11,795	Average	Poor	14,043	2,249
Prince Rupert District	13,338	Average	Poor	44,875	8,973
Central Coast	19,401	Average	Poor - Average	40,311	8,058
Strait Of Georgia	23,369	Good	Average	172,401	34,469
West Coast Vancouver Island	20,723	Poor	Poor-Average	37,203	7,441
Total				**308,833**	**61,190**

* Forecast biomass was determined using the RASM 2q model for all areas.

Table 2. Herring working group - 2003 / 2004 expected herring use (tons) by fishery and area

AREA	PSARC CATCH (a)	FSC (b)	ROE HERRING			SOK		WINTER FOOD & BAIT	SPECIAL USE		PERS'L USE BAIT	CHARITY	ZOO & AQUAR	TOTAL NON-ROE
			COM (d)	ACTUAL	HCRS (e)	J-LICENSE	COMM COM		COMM.	SPORT				
QCI														
	2,249	150	1,099	0	0	1,000	0	0	0	0	0	0	0	1,150
PR														
	8,973	600	6,513	4,500	580	1,000	0	0	220	50	10	0	0	1,880
CC						(170)								
	8,058	600	5,638	2,500	575	600	525	0	0	100	20	0	0	1,845
GULF						(100)								
	34,469	35	31,483	17,755	1,090		0	1,400	0	50	25	275	110	1,895
WCVI						(105)								
	7,441	150	6,236	4,700	655	400	0	0	0	0	0	0	0	550
TOTAL						(375)								
	61,190	1,535	50,969	29,455	2,900	3,000	525	1,400	220	200	55	275	110	7,320

a) Based on forecast abundance of major migratory stocks (Minor stocks are shown in brackets).

b) Communal licences for food social ceremonial purposes will not limit access. DFO will work with the First Nations on a cooperative catch monitoring program.

c) Includes 300 ton allocation to Walcan and 200 ton to
Fjord

d) Commercial roe allocation does not necessarily reflect the actual quota utilized

e) HCRS is part of the roe quota and not included in the total non-roe amount

Table 2. Herring working group - 2003 / 2004 expected herring use (tons) by fishery and area

AREA	PSARC CATCH (a)	FSC (b)	ROE HERRING			SOK		WINTER FOOD & BAIT	SPECIAL USE		PERS'L USE BAIT	CHARITY	ZOO & AQUAR	TOTAL NON-ROE
			COM (d)	ACTUAL	HCRS (c)	J-LICENSE	COMM COM		COMM.	SPORT				
QCI	2,249	150	1,099	0	0	1,000	0	0	0	0	0	0	0	1,150
PR	8,973	600	6,513	4,500	580	1,000	0	0	220	50	10	0	0	1,880
CC	8,058	600	5,638	2,500	575	(170) 600	525	0	0	100	20	0	0	1,845
GULF	34,469	35	31,483	17,755	1,090	(100)	0	1,400	0	50	25	275	110	1,895
WCVI	7,441	150	6,236	4,700	655	(105) 400	0	0	0	0	0	0	0	550
TOTAL	61,190	1,535	50,969	29,455	2,900	(375) 3,000	525	1,400	220	200	55	275	110	7,320

a) Based on forecast abundance of major migratory stocks (Minor stocks are shown in brackets).

b) Communal licences for food social ceremonial purposes will not limit access. DFO will work with the First Nations on a cooperative catch monitoring program.

c) Includes 300 ton allocation to Walcan and 200 ton to Ford

d) Commercial roe allocation does not necessarily reflect the actual quota utilized.

e) HCRS is part of the roe quota and not included in the total non-roe amount.

Table 3. Final fishery notice of the 2004 roe herring fishing season.

AREA	NO. OF LICENCES	TARGET CATCH	CATCH *	% TOTAL CATCH	FISHERY DATES AND LOCATIONS
Strait of Georgia:					
Seine	119	8,700	7,737	31.9	Open 12:47 to 19:25 March 10 in Subareas 17-18 and 17-19. Re-open 09:20 to 19:15 March 11 in 17-18 and 17-19. Re-open 05:05 March 12 in 17-18 and 17-19, and extended open areas 13:30 March 12 to include 17-12, 17-13, 17-14, 17-15 & 17-21 and these areas closed 20:21 March 12. Re-open 06:05 to 16:01 Mar 13 in 17-12 to 17-19.
Gill Net	926	9,055	5,636	23.24	Open 08:00 March 10 in Subareas 14-1 to 14-13, 14-15, 17-10, 17-12, 17-13, 17-18, 17-19 & 17-21. Open 20:00 March 12 in 17-14 to 17-16. Open 16:00 March 14 in Subarea 17-1 to 17-10, 17-15 to 17-17, and all of Area 18. Closed 10:00 March 15 in all of Area 14 Subareas 17-12 to 17-14, 17-18, 17-19 & 17-21. Closed 18:00 March 15 in Subareas 17-1 to 17-10, 17-15 to 17-17 and all of Area 18. Re-open 20:00 Mar 20 until 16:00 Mar 29 in Subareas 17-1 to 17-10, 17-15 to 17-17 and all of Area 18
Central Coast:					
Seine	43	2,500	2,559	10.55	Open 08:00 Mar 24 to 07:00 Mar 25 in Subarea 7-13, portion of 7-12, and a portion of 7-8.
WCVI:					
Seine	52	3,500	3,689	15.21	Open 11:00 March 14 to 16:09 March 15 in Subarea 25-13.
Gill net	91	1,200	654	2.7	Open 13:00 March 14 to 15:00 Mar 19 in Subarea 25-13.
Prince Rupert:					
Seine	26	1,500	1,646	6.79	Open 13:35 to 22:00 Mar 27 in Subareas 5-4, 5-5 and portion 5-6. Re-opened 07:35 to 16:30 Mar 29.
Gill Net	227	3,000	2,330	9.61	Open 20:00 Mar 19 to 18:00 Mar 25 in Subareas 4-5 to 4-9 and 4-14
Total–Sn	**240**	**16,200**	**15,631**	**64.46%**	
Total–Gn	**1,244**	**13,255**	**8,620**	**35.54%**	
Total	**1,484**	**29,455**	**24,251**	**100.0%**	

*Catch numbers are weights validated at the point of landing.

Table 4. 2004 Roe quota and validated landed catch (tons) by gear type and region

Region	Statistical Area	SEINE				GILLNET				TOTAL ROE	
		Quota	# of licences	# of pools (SN)	Validated Catch	Quota	# of licences	# of pools (GN)	Validated Catch	Quota	Validated Catch
QCI	2E	No fishery				No fishery					
Prince Rupert	3-5	1,500	26	2	1,646	3,000	227	8	2,330	4,500	3,976
Central Coast	6-8	2,500	43	3	2,559	No fishery				2,500	2,559
Gulf	14-18	8,700	119	3^	7,737	9,055	926	15	5,636	17,755	13,373
WCVI	23-25	3,500	52	3	3,689	1,200	91	7	654	4,700	4,343
Total		16,200	240*		15,631	13,255	1,244=		8,620	29,455	24,251

* Number of seine licences does not include 12 licences retired for test fishing
= Number of gillnet licences does not include 8 licences retired for test fishing
^ Initially 9 pools where licensed for the Gulf but organised into 3 super pools for fishing.

Table 5. 2004 Spawn summary by location, date and statistical area.

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 2W: West Coast Q.C.I.							
Surface Survey							
McKenzie Cv	01/Apr	02/Apr	268	1	0.29	70	0.05
McKenzie Cv	01/Apr	02/Apr	308	2	0.55	80	0.27
Surface Survey Area Total							0.32
Dive Survey							
Clapp Basin	30/Mar	30/Mar	900	35	0.31	63	6.15
Clonard Bay	30/Mar	30/Mar	2200	39	0.44	62	23.75
Bottom				39	0.15	24	3.17
Macrocystis			500	48	1.88		12.87
Kano Inlt	28/Mar	28/Mar	6000	46	1.21	52	176.05
Bottom				46	0.36	32	32.05
Macrocystis			2300	19	1.13		4.28
Port Louis	26/Mar	29/Mar	6600	38	1.18	51	149.30
Bottom				38	0.86	29	61.29
Macrocystis			500	15	0.25		0.27
Seal Inlt	30/Mar	30/Mar	5000	20	1.74	68	119.02
Bottom				20	1.13	22	24.27
Macrocystis			2800	14	1.89		16.03
Shields Bay	30/Mar	30/Mar	5700	25	1.78	60	150.13
Bottom				25	0.95	16	21.91
Macrocystis			2000	22	1.40		19.32
Dive Survey Area Total							819.86
Statistical Area 2E: East Coast Q.C.I.							
Surface Survey							
Huston Inlt	14/Feb	15/Feb	550	35	1.75	60	20.21
Huston Inlt	14/Feb	15/Feb	400	35	0.63	70	6.13
Huston Inlt	14/Feb	15/Feb	500	25	1.35	50	8.44
Huston Inlt	14/Feb	15/Feb	600	50	1.35	70	28.35
Huston Inlt	14/Feb	15/Feb	375	20	2.70	60	12.15
Huston Inlt	26/Mar	27/Mar	450	30	0.75	50	5.06
Huston Inlt	26/Mar	27/Mar	600	10	0.50	70	2.10
Huston Inlt	27/Mar	29/Mar	700	20	1.88	75	19.69
Huston Inlt	28/Mar	30/Mar	750	20	2.30	75	25.88
Huston Inlt	28/Mar	30/Mar	1000	30	1.98	80	47.40
Huston Inlt	28/Mar	30/Mar	1000	15	2.30	80	27.60
Huston Inlt	28/Mar	30/Mar	400	10	1.40	50	2.80
Huston Inlt	28/Mar	30/Mar	50	20	0.50	100	0.50
Lagoon Inlt	03/Feb	05/Feb	400	5	0.10	60	0.12

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 2E: East Coast Q.C.I.				Continued			
Traynor Cr	03/Feb	05/Feb	1500	20	2.70	90	72.90
Traynor Cr	03/Feb	05/Feb	500	20	1.20	80	9.60
Traynor Cr	03/Feb	05/Feb	500	25	3.30	90	37.13
Traynor Cr	03/Feb	05/Feb	600	50	0.50	75	11.25
Surface Survey Area Total							337.30
Dive Survey							
Alder Is	30/Mar	01/Apr	1100	15	1.69	75	20.88
Bottom				15	0.44	100	7.22
Macrocystis			300	5	1.00		0.97
Dolomite Nrws	14/Mar	16/Mar	1400	28	0.80	43	13.14
Bottom				28	0.50	25	4.88
Hutton Inlt	31/Mar	02/Apr					
Macrocystis			700	10	0.13		0.22
Kilmington Pt	09/Mar	14/Mar	500	35	0.71	30	3.67
Bottom				35	1.03	79	14.21
Macrocystis			1100	33	1.38		2.50
Lagoon Inlt	03/Feb	04/Feb		36	0.98	42	
Bottom				36	0.69	47	
Lagoon Inlt	31/Mar	03/Apr	3900	31	1.50	53	96.86
Bottom				31	1.15	48	66.35
Little Goose	31/Mar	03/Apr	1000	23	0.73	61	10.19
Bottom				23	0.58	59	7.65
Marco Is	31/Mar	06/Apr	3000	56	0.32	59	31.36
Macrocystis			3000	22	1.05		26.40
Marshall Inlt	01/Apr	04/Apr	2600	29	0.90	71	47.87
Bottom				29	0.17	29	3.69
Macrocystis			1400	41	1.25		20.38
Matheson Inlt	01/Apr	04/Apr	1300	10	0.33	34	1.47
Bottom				10	0.33	21	0.93
Macrocystis			900	17	0.58		3.71
Smith Pt	14/Mar	16/Mar	500	52	1.26	56	18.26
Bottom				52	1.22	18	5.58
Macrocystis			2000	41	1.54		5.40
Werner Pt	30/Mar	02/Apr	1400	75	2.57	49	131.49
Bottom				75	1.73	33	59.77
Macrocystis			2500	69	3.63		172.27
Dive Survey Area Total							777.33

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 03: Nass							
Dive Survey							
Bath Pt	24/Mar	31/Mar	1050	66	0.71	47	23.03
Bottom				66	0.50	2	0.66
Cunningham Pass	27/Mar	31/Mar	1015	30	2.54	71	54.62
Bottom				30	0.09	24	0.67
Cunningham Pass	27/Mar	31/Mar	1015	35	1.26	54	24.36
Macrocystis				47	0.75		
Cunningham Pass	27/Mar	31/Mar	980	57	1.92	37	39.22
Bottom				57	0.50	12	3.23
Flewin Pt	31/Mar	04/Apr	700	59	0.77	32	10.36
Bottom				59	0.62	29	7.33
Grassy Pt	01/Apr	05/Apr	4200	49	0.95	51	100.96
Bottom				49	0.55	29	32.85
Stumaun Bay	31/Mar	02/Apr	1300	25	0.95	54	16.18
Bottom				25	0.26	14	1.12
Stumaun Bay	31/Mar	02/Apr	1650	122	1.75	55	191.93
Village Is	27/Mar	31/Mar	2100	60	1.35	42	71.16
Bottom				60	0.69	7	6.18
Dive Survey Area Total							583.86
Statistical Area 04: Skeena							
Dive Survey							
Belletti Pt	26/Mar	27/Mar	2100	152	0.61	48	94.24
Bottom				152	0.20	21	13.94
Big Bay	23/Mar	24/Mar	5950	209	1.35	56	944.28
Bottom				209	0.24	8	24.89
Burnt Cliff Is	23/Mar	25/Mar	1400	358	1.29	36	229.37
Bottom				358	0.45	11	24.45
Butler Cv	01/Apr	01/Apr	1050	114	0.50	78	46.33
Macrocystis			1400	107	1.13		11.81
Duncan Bay	20/Mar	24/Mar	3500	175	0.99	31	185.92
Bottom				175	0.72	9	39.34
Macrocystis			700	250	0.50		2.55
Island Pt	08/Apr	09/Apr	1050	78	0.42	48	16.60
Bottom				78	0.01	13	0.11
Macrocystis			1050	52	1.00		5.05
Observation Pt	23/Mar	24/Mar	700	312	0.69	28	41.82
Bottom				312	0.41	19	16.69
Pearl Hrbr	26/Mar	27/Mar	2520	50	1.61	60	122.60
Reeks Pt	21/Mar	24/Mar	2450	255	1.35	54	449.95
Bottom				255	0.01	1	0.03
Swamp Is	22/Mar	25/Mar	4550	308	0.90	28	356.26
Bottom				308	0.41	17	95.83
Macrocystis			350	38	0.25		0.29

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 04: Skeena			Continued				
Tree Bluff	19/Mar	23/Mar	5250	421	1.59	37	1307.34
Bottom				421	0.47	20	203.54
Macrocystis			350	20	0.25		0.32
Tugwell Is	23/Mar	24/Mar	2100	350	0.79	59	342.10
Bottom				350	0.28	12	23.96
Macrocystis			350	75	0.50		0.30
Dive Survey Area Total							4599.93
Statistical Area 05: Grenville-Principe							
Surface Survey							
Nubble Pt	19/Mar	/	915	70	2.01	75	96.68
Surface Survey Area Total							96.68
Dive Survey							
Dries Inlt	21/Mar	24/Mar	4200	242	1.46	38	569.25
Bottom				242	0.96	19	186.03
Gurd Inlt	02/Apr	05/Apr	1750	76	1.36	39	70.11
Bottom				76	1.00	13	17.15
Gurd Pt	02/Apr	05/Apr	2450	49	1.71	46	94.69
Bottom				49	0.83	25	24.73
Kitkatla Cr	21/Mar	24/Mar	1400	83	0.50	47	27.18
Bottom				83	0.01	0	0.01
Nubble Pt	19/Apr	/	350	18	1.04	21	1.37
Bottom				18	0.25	11	0.17
Robert Is	02/Apr	05/Apr	3500	155	1.54	37	312.96
Bottom				155	0.64	24	82.81
Dive Survey Area Total							1386.46

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 06: Butedale							
Dive Survey							
Abrams Is	02/Apr	02/Apr	250	26	1.04	46	3.13
Bottom				26	1.00	71	4.63
Clifford Bay	02/Apr	03/Apr	5250	86	1.10	54	269.38
Bottom				86	0.61	31	84.20
Macrocystis			4550	93	2.36		221.45
Kettle Inlt	03/Apr	05/Apr	700	17	1.58	43	7.82
Bottom				17	0.15	50	0.89
Kettle Inlt	03/Apr	05/Apr	3200	86	1.94	44	236.15
Bottom				86	0.46	28	36.07
Macrocystis			1100	9	5.08		20.88
Kettle Inlt	03/Apr	05/Apr	1100	20	1.45	53	17.15
Bottom				20	0.98	59	12.92
Macrocystis			200	13	6.50		4.16
Kwakwa Cr	01/Apr	04/Apr	1400	36	2.40	48	57.95
Bottom				36	1.21	62	37.92
Macrocystis			1400	24	4.00		62.16
Marvin Is	/	02/Apr	1800	79	1.41	42	83.90
Bottom				79	1.65	47	110.13
Macrocystis			1800	24	5.25		58.72
Osment Inlt	/	04/Apr	1440	45	2.10	51	69.03
Bottom				45	1.12	64	46.03
Macrocystis			1440	26	2.56		22.26
Osment Inlt	/	04/Apr	3500	51	1.51	45	120.47
Bottom				51	0.74	63	82.94
Macrocystis			3500	32	3.67		36.33
Parsons Anch	27/Mar	02/Apr	2450	49	2.03	47	113.45
Bottom				49	1.18	47	66.71
Macrocystis			2450	16	4.92		58.31
Wilby Pt	27/Mar	04/Mar	5600	52	1.57	40	180.32
Bottom				52	1.01	40	118.03
Macrocystis			4900	25	4.63		166.07
Dive Survey Area Total							2409.57
Statistical Area 07: Bella Bella							
Dive Survey							
Bullen Rk	01/Apr	08/Apr	2100	21	2.14	47	43.99
Bottom				21	1.43	72	44.76
Bush Pt	01/Apr	08/Apr	1400	46	2.53	51	82.46
Bottom				46	0.66	51	21.70
Cultus Snd	04/Apr	08/Apr	700	9	1.89	62	7.34
Bottom				9	2.10	53	7.06
Macrocystis			700	20	5.81		24.72
Cultus Snd	04/Apr	08/Apr	700	145	4.11	43	178.38

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 07: Bella Bella				Continued			
Bottom				145	2.63	22	58.08
E Higgins Pass	01/Apr	03/Apr	1850	6	1.00	45	5.02
Bottom				6	0.73	85	6.94
Macrocystis			700	8	2.75		0.67
E Higgins Pass	01/Apr	04/Apr	2140	85	1.29	69	161.07
Bottom				85	1.08	30	59.06
E Higgins Pass	01/Apr	03/Apr	1800	42	0.75	41	22.93
Bottom				42	0.35	44	11.43
E Higgins Pass	01/Apr	03/Apr	5250	50	2.39	48	303.82
Bottom				50	1.34	66	232.37
Macrocystis			1400	31	1.63		6.57
Foote Islets	01/Apr	08/Apr	4200	25	2.73	50	143.05
Bottom				25	1.70	58	104.17
Idol Pt	04/Apr	04/Apr	700	37	1.45	50	18.79
Bottom				37	0.75	38	7.30
James Bay	01/Apr	04/Apr	1750	14	2.09	48	25.00
Bottom				14	1.06	60	16.16
Little Thompson Bay	04/Apr	04/Apr	3500	16	0.88	42	19.97
Bottom				16	0.91	28	13.72
McNaughton Grp	06/Apr	06/Apr	350	64	0.46	36	3.72
Bottom				64	1.13	10	2.41
Mosquito Bay	01/Apr	08/Apr	4900	16	2.87	51	111.26
Bottom				16	1.86	66	93.88
Neekas Inlt	01/Apr	08/Apr	1400	22	1.67	58	29.20
Bottom				22	0.81	88	21.80
Quinoot Pt	08/Apr	09/Apr	350	63	1.54	78	26.63
Bottom				63	1.75	18	7.07
Quinoot Pt	08/Apr	09/Apr	700	14	0.99	57	5.50
Spiller Chnl	01/Apr	08/Apr	8400	21	3.60	56	356.83
Bottom				21	2.07	71	260.30
Tankeeah River	01/Apr	08/Apr	2100	23	3.29	51	80.09
Bottom				23	1.84	80	70.61
Troup Pass	04/Apr	04/Apr	1050	11	0.28	11	0.37
Waskesiu Pass	04/Apr	08/Apr	1750	24	2.21	40	37.76
Bottom				24	1.37	38	21.85
Dive Survey Area Total							2755.80

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 08: Bella Coola							
Dive Survey							
Corvette Is	24/Mar	31/Mar	350	80	1.92	40	21.47
Bottom				80	2.00	33	18.67
Fairmile Pass	24/Mar	31/Mar	700	6	1.95	10	0.75
Bottom				6	1.50	67	3.86
Illahie Inlt	24/Mar	31/Mar	15400	35	3.08	45	735.98
Bottom				35	2.33	57	708.25
Illahie Inlt	29/Mar	31/Mar	350	89	0.93	21	5.94
Bottom				89	1.00	3	0.97
Kwakshua Chnl	04/Apr	04/Apr	700	32	0.99	76	16.82
Bottom				32	1.13	8	2.10
Kwakume Inlt	29/Mar	31/Mar	4550	28	2.17	51	143.17
Bottom				28	1.78	21	48.23
Kwakume Pt	29/Mar	01/Apr	1050	28	2.59	49	37.65
Bottom				28	2.33	36	24.87
Kwakume Pt	29/Mar	01/Apr	700	26	2.98	44	23.82
Bottom				26	1.75	47	14.97
Pruth Bay	04/Apr	04/Apr	5050	11	1.69	61	59.03
Bottom				11	1.08	22	13.57
Whidbey Pt	29/Mar	31/Mar	1525	4	2.16	46	5.56
Bottom				4	2.25	37	4.61
Whidbey Pt	29/Mar	31/Mar	1330	4	4.18	57	13.66
Bottom				4	1.44	19	1.59
Dive Survey Area Total							1905.54
Statistical Area 09: Rivers Inlet							
Dive Survey							
Duncanby Landing	03/Apr	04/Apr	1050	26	1.33	40	14.67
Bottom				26	0.50	12	1.66
Goose Bay	02/Apr	04/Apr	5250	61	1.23	40	159.73
Bottom				61	0.74	27	64.27
McAllister Pt	30/Mar	31/Mar	1750	8	1.26	52	8.68
Bottom				8	0.34	27	1.21
McAllister Pt	30/Mar	31/Mar	760	12	0.40	43	1.57
Bottom				12	0.67	60	3.67
Moses Inlt	29/Mar	01/Apr	2120	9	1.60	31	9.84
Bottom				9	2.08	48	19.79
Moses Inlt	29/Mar	01/Apr	1360	8	1.06	51	5.92
Bottom				8	0.25	44	1.19
Moses Inlt	29/Mar	01/Apr	440	2	0.63	85	0.47
Bottom				2	0.25	100	0.22
Moses Inlt	29/Mar	01/Apr	11000	10	1.66	69	122.12
Bottom				10	1.39	35	52.53
Moses Inlt	29/Mar	01/Apr	24240	17	2.05	55	457.67

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 09: Rivers Inlet				Continued			
Bottom				17	1.66	46	308.45
Moses Inlt	29/Mar	01/Apr	2440	24	0.58	40	13.38
Bottom				24	0.25	33	4.78
Dive Survey Area Total							1251.82
Statistical Area 10: Smith Inlet							
Surface Survey							
McBride Bay	27/Feb	02/Mar	208	4	1.00	50	0.42
McBride Bay	27/Feb	02/Mar	83	4	1.80	80	0.48
McBride Bay	27/Feb	02/Mar	80	6	0.50	80	0.19
McBride Bay	27/Feb	02/Mar	74	2	1.80	80	0.21
McBride Bay	27/Feb	02/Mar	47	2	3.10	80	0.23
McBride Bay	27/Feb	02/Mar	50	2	0.70	80	0.06
McBride Bay	27/Feb	02/Mar	60	6	1.70	80	0.49
McBride Bay	27/Feb	02/Mar	25	4	2.40	80	0.19
McBride Bay	27/Feb	02/Mar	73	4	1.00	80	0.23
McBride Bay	27/Feb	02/Mar	41	4	2.80	80	0.37
McBride Bay	27/Feb	02/Mar	237	4	3.40	90	2.90
McBride Bay	27/Feb	02/Mar	155	4	1.40	90	0.78
McBride Bay	27/Feb	02/Mar	53	2	3.40	90	0.32
McBride Bay	27/Feb	02/Mar	177	4	4.20	100	2.97
McBride Bay	27/Feb	02/Mar	40	4	1.80	70	0.20
McBride Bay	27/Feb	02/Mar	300	2	0.50	20	0.06
McBride Bay	24/Mar	26/Mar	64	2	3.10	80	0.32
McBride Bay	24/Mar	26/Mar	57	2	2.40	70	0.19
McBride Bay	24/Mar	26/Mar	18	2	1.20	70	0.03
McBride Bay	24/Mar	26/Mar	68	4	2.60	90	0.64
McBride Bay	24/Mar	26/Mar	19	4	3.70	90	0.25
McBride Bay	24/Mar	26/Mar	18	4	1.80	70	0.09
McBride Bay	24/Mar	26/Mar	129	4	3.40	80	1.40
McBride Bay	24/Mar	26/Mar	65	4	4.20	80	0.87
McBride Bay	24/Mar	26/Mar	34	6	3.40	80	0.55
McBride Bay	24/Mar	26/Mar	253	10	0.61	80	1.23
McBride Bay	24/Mar	26/Mar	65	4	4.60	90	1.08
McBride Bay	24/Mar	26/Mar	64	4	2.60	90	0.60
McBride Bay	24/Mar	26/Mar	167	4	0.80	70	0.38
McBride Bay	24/Mar	26/Mar	135	4	1.40	80	0.61
McBride Bay	24/Mar	26/Mar	63	4	0.80	70	0.14
McBride Bay	24/Mar	26/Mar	97	4	2.80	80	0.87
McBride Bay	24/Mar	26/Mar	182	2	1.80	80	0.52
Surface Survey Area Total							19.89

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 10: Smith Inlet			Continued				
Dive Survey							
Birkby Pt	01/Apr	04/Apr	2450	14	1.88	47	30.13
Bottom				14	1.93	28	18.05
Macrocystis			1050	6	4.67		4.29
Dry Cr	01/Apr	04/Apr	720	7	1.08	38	1.90
Bottom				7	1.25	33	1.95
Dry Cr	01/Apr	04/Apr	1120	59	1.28	61	51.69
Bottom				59	1.13	32	23.54
McBride Bay	01/Apr	04/Apr	1750	17	1.20	67	23.34
Bottom				17	0.25	6	0.45
Takush Hrbr	31/Mar	01/Apr	2120	11	0.81	56	10.73
Bottom				11	1.13	29	7.61
Macrocystis			1050	5	1.67		2.49
Takush Hrbr	31/Mar	01/Apr	600	2	0.75	48	0.43
Bottom				2	1.00	13	0.15
Dive Survey Area Total							176.75
Statistical Area 12: Alert Bay							
Surface Survey							
Ahnuhati Pt	08/Mar	09/Mar	121	3	1.80	90	0.59
Ahnuhati Pt	08/Mar	09/Mar	220	2	2.45	90	0.97
Ahnuhati Pt	09/Mar	09/Mar	150	2	1.00	80	0.24
Ahnuhati Pt	09/Mar	09/Mar	80	4	1.45	85	0.39
Ahnuhati Pt	09/Mar	09/Mar	237	2	1.00	85	0.40
Axe Pt	06/Mar	06/Mar	30	3	1.48	85	0.11
Axe Pt	09/Mar	09/Mar	50	2	1.95	90	0.18
Baronet Pass	27/Feb	04/Apr	50	10	1.00	90	0.45
Baronet Pass	27/Feb	04/Apr	103	2	0.53	75	0.08
Baronet Pass	27/Feb	04/Apr	80	2	1.00	80	0.13
Baronet Pass	27/Feb	04/Apr	10	1	2.00	90	0.02
Baronet Pass	27/Feb	04/Apr	30	10	1.00	70	0.21
Bond Snd	30/Mar	01/Apr	45	2	1.90	80	0.14
Bond Snd	30/Mar	01/Apr	200	1	1.70	90	0.31
Bond Snd	30/Mar	01/Apr	147	4	2.70	95	1.51
Bond Snd	30/Mar	01/Apr	250	1	1.45	85	0.31
Bond Snd	06/Mar	06/Mar	50	2	1.20	90	0.11
Bond Snd	06/Mar	06/Mar	100	2	1.35	85	0.23
Bond Snd	06/Mar	06/Mar	50	2	1.45	90	0.13
Boughey Bay	08/Apr	10/Apr	120	4	1.00	85	0.41
Boughey Bay	08/Apr	10/Apr	60	15	1.00	75	0.68
Boughey Bay	08/Apr	10/Apr	54	6	1.00	75	0.24
Deer Bay	09/Mar	09/Mar	420	1	0.50	70	0.15

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 12: Alert Bay			Continued				
Deer Bay	09/Mar	09/Mar	50	10	0.25	90	0.11
Deer Bay	09/Mar	09/Mar	100	10	1.55	90	1.40
Deer Bay	09/Mar	09/Mar	30	5	2.80	90	0.38
Deer Bay	06/Mar	06/Mar	30	2	2.80	90	0.15
Franklin Flats +	06/Mar	06/Mar	368	10	2.30	95	8.04
Glacier Bay +	08/Mar	08/Mar	280	2	0.53	70	0.21
Glacier Bay +	08/Mar	08/Mar	300	3	1.00	85	0.77
Glendale Cv	01/Apr	01/Apr	45	2	1.00	80	0.07
Glendale Cv	01/Apr	01/Apr	60	3	2.80	85	0.43
Glendale Cv	01/Apr	01/Apr	20	1	1.00	90	0.02
Kingcome Inlt	14/Mar	14/Mar	131	1	1.00	80	0.10
Kingcome Inlt	14/Mar	14/Mar	238	3	2.20	85	1.34
Kingcome Inlt	14/Mar	14/Mar	207	1	0.50	60	0.06
Kingcome Inlt	29/Mar	29/Mar	150	4	2.80	80	1.34
Kingcome Inlt	29/Mar	29/Mar	305	2	1.45	90	0.80
Kingcome Inlt	29/Mar	29/Mar	20	2	0.53	90	0.02
Kingcome Inlt	29/Mar	29/Mar	60	2	1.00	85	0.10
Kingcome Inlt	29/Mar	29/Mar	160	2	2.00	90	0.58
Kingcome Inlt	29/Mar	29/Mar	100	4	2.90	90	1.04
Kingcome Inlt	30/Mar	30/Mar	136	4	2.80	90	1.37
Kingcome Inlt	30/Mar	30/Mar	243	45	3.35	95	34.80
Kingcome Inlt	30/Mar	30/Mar	150	2	1.48	85	0.38
Kingcome Inlt	30/Mar	30/Mar	127	1	0.55	80	0.06
Knight Inlt	31/Mar	01/Apr	83	4	2.35	90	0.70
Knight Inlt	31/Mar	01/Apr	293	3	1.80	85	1.34
Knight Inlt	31/Mar	01/Apr	50	4	1.90	90	0.34
Knight Inlt	31/Mar	01/Apr	30	3	2.90	90	0.23
Knight Inlt	31/Mar	01/Apr	60	3	1.80	85	0.28
Knight Inlt	31/Mar	01/Apr	121	2	1.45	80	0.28
Knight Inlt	31/Mar	01/Apr	90	3	1.95	85	0.45
Knight Inlt	01/Mar	03/Mar	154	2	2.40	80	0.59
Knight Inlt	01/Mar	03/Mar	50	2	1.45	80	0.12
Knight Inlt	01/Mar	03/Mar	80	2	1.00	80	0.13
Knight Inlt	01/Mar	03/Mar	150	4	2.40	90	1.30
Reid Bay	01/Apr	02/Apr	312	3	1.40	70	0.92
Rubble Pt	01/Mar	04/Mar	200	1	0.33	75	0.05
Rubble Pt	01/Mar	04/Mar	280	1	1.00	60	0.17
Rubble Pt	01/Mar	04/Mar	286	2	2.70	80	1.24
Rubble Pt	01/Mar	04/Mar	150	4	3.60	90	1.94
Rubble Pt	01/Mar	04/Mar	1650	1	1.00	70	1.16
Rubble Pt	01/Mar	04/Mar	125	5	3.35	90	1.88
Rubble Pt	01/Mar	04/Mar	1169	1	1.00	80	0.94
Thompson Snd	29/Mar	01/Apr	50	2	1.00	80	0.08
Thompson Snd	29/Mar	01/Apr	100	1	1.45	85	0.12
Thompson Snd	29/Mar	01/Apr	130	1	1.45	90	0.17
Thompson Snd	29/Mar	01/Apr	1037	2	2.35	70	3.41
Thompson Snd	29/Mar	01/Apr	40	1	1.90	90	0.07
Thompson Snd	29/Mar	01/Apr	40	1	1.90	90	0.07
Thompson Snd	29/Mar	01/Apr	121	1	1.80	90	0.20

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 12: Alert Bay			Continued				
Thompson Snd	29/Mar	01/Apr	90	1	1.48	90	0.12
Thompson Snd	29/Mar	01/Apr	525	2	1.90	80	1.60
Thompson Snd	29/Mar	01/Apr	60	20	1.50	80	1.44
Thompson Snd	29/Mar	01/Apr	100	1	1.00	80	0.08
Thompson Snd	29/Mar	01/Apr	245	1	0.53	70	0.09
Thompson Snd	29/Mar	01/Apr	38	1	1.00	85	0.03
Thompson Snd	29/Mar	01/Apr	30	6	1.85	90	0.30
Thompson Snd	29/Mar	01/Apr	125	2	1.80	80	0.36
Tribune Chnl	30/Mar	01/Apr	60	3	2.80	80	0.40
Tribune Chnl	30/Mar	01/Apr	60	2	1.90	90	0.21
Tribune Chnl	30/Mar	01/Apr	80	1	1.48	90	0.11
Tribune Chnl	30/Mar	01/Apr	25	1	1.00	95	0.02
Tribune Chnl	30/Mar	01/Apr	25	1	1.00	95	0.02
Tribune Chnl	30/Mar	01/Apr	10	1	1.95	95	0.02
Tribune Chnl	30/Mar	01/Apr	45	1	1.00	90	0.04
Tribune Chnl	30/Mar	01/Apr	132	10	1.50	75	1.49
Tribune Chnl	30/Mar	01/Apr	30	2	1.90	90	0.10
Tribune Chnl	30/Mar	01/Apr	95	1	2.28	95	0.21
Tribune Chnl	30/Mar	01/Apr	30	1	1.00	95	0.03
Tribune Chnl	30/Mar	01/Apr	39	12	4.40	95	1.96
Tribune Chnl	30/Mar	01/Apr	859	2	1.80	80	2.47
Wahkash Cr	01/Mar	04/Mar	537	2	1.00	80	0.86
Wahkash Cr	01/Mar	04/Mar	414	2	1.00	80	0.66
Wahkash Cr	01/Mar	04/Mar	512	1	1.00	70	0.36
Wahkash Cr	01/Mar	04/Mar	30	1	0.29	75	0.01
Wahkash Cr	01/Mar	04/Mar	30	1	0.25	90	0.01
Wahkash Cr	01/Mar	04/Mar	497	1	0.50	80	0.20
Wahkash Cr	01/Mar	04/Mar	337	6	1.45	90	2.64
Wahshihlas Bay	06/Mar	06/Mar	241	3	1.90	75	1.03
Wahshihlas Bay	06/Mar	06/Mar	300	1	0.25	70	0.05
Wahshihlas Bay	06/Mar	06/Mar	50	10	1.90	90	0.86
Wahshihlas Bay	06/Mar	06/Mar	20	6	1.00	90	0.11
Wahshihlas Bay	06/Mar	06/Mar	1920	1	0.53	55	0.55
Wahshihlas Bay	06/Mar	06/Mar	635	2	1.90	80	1.93
Wahshihlas Bay	06/Mar	06/Mar	1129	4	3.90	90	15.85
Wakeman Snd	14/Mar	14/Mar	668	3	1.80	90	3.25
Wakeman Snd	14/Mar	14/Mar	680	2	1.45	90	1.77
Wakeman Snd	14/Mar	14/Mar	150	2	1.90	90	0.51
Wakeman Snd	14/Mar	14/Mar	100	2	1.90	85	0.32
Wakeman Snd	14/Mar	14/Mar	390	1	0.53	80	0.16
Wakeman Snd	14/Mar	14/Mar	75	2	1.90	90	0.26
Wakeman Snd	14/Mar	14/Mar	420	2	0.53	80	0.35
Wakeman Snd	14/Mar	14/Mar	3341	1	0.29	70	0.67
Wakeman Snd	14/Mar	14/Mar	30	4	1.80	90	0.19
Wakeman Snd	14/Mar	14/Mar	1905	2	0.29	70	0.77
Wakeman Snd	14/Mar	14/Mar	50	3	2.35	90	0.32
Wakeman Snd	14/Mar	14/Mar	1000	1	0.55	80	0.44
Wakeman Snd	14/Mar	14/Mar	420	1	0.50	75	0.16
Wakeman Snd	14/Mar	14/Mar	100	3	1.45	75	0.33

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 12: Alert Bay			Continued				
Wakeman Snd	14/Mar	14/Mar	30	2	1.00	90	0.05
Wakeman Snd	14/Mar	14/Mar	50	1	0.53	90	0.02
Wakeman Snd	14/Mar	14/Mar	165	1	1.00	80	0.13
Wakeman Snd	14/Mar	14/Mar	100	1	0.55	85	0.05
Surface Survey Area Total							125.65
Dive Survey							
Cattle Is	27/Mar	27/Mar	170	47	1.91	62	9.30
Dive Survey Area Total							9.30
Statistical Area 13: Quathiaski							
Surface Survey							
Deepwater Bay	02/Mar	05/Mar	33	20	2.80	80	1.48
Deepwater Bay	02/Mar	05/Mar	113	30	2.70	60	5.49
Deepwater Bay	02/Mar	05/Mar	20	20	2.90	90	1.04
Deepwater Bay	02/Mar	05/Mar	95	6	2.90	90	1.49
Deepwater Bay	02/Mar	05/Mar	51	4	1.80	90	0.33
Deepwater Bay	02/Mar	05/Mar	121	6	0.80	80	0.47
Frazer Bay	24/Mar	26/Mar	27	4	0.80	70	0.06
Frazer Bay	24/Mar	26/Mar	136	4	3.40	90	1.66
Frazer Bay	24/Mar	26/Mar	195	6	0.90	20	0.21
Frazer Bay	24/Mar	26/Mar	29	4	1.40	80	0.13
Frazer Bay	24/Mar	26/Mar	64	6	2.10	80	0.65
Frazer Bay	24/Mar	26/Mar	57	6	1.50	80	0.41
Frazer Bay	24/Mar	26/Mar	118	6	1.00	70	0.50
Hamilton Pt	15/Mar	20/Mar	1500	1	1.00	40	0.60
Waddington Hrbr	27/Feb	08/Mar	165	2	0.50	50	0.08
Waddington Hrbr	27/Feb	08/Mar	400	2	0.16	10	0.01
Waddington Hrbr	27/Feb	08/Mar	235	2	0.61	90	0.26
Waddington Hrbr	27/Feb	08/Mar	115	2	1.40	90	0.29
Waddington Hrbr	27/Feb	08/Mar	98	2	1.06	90	0.19
Waddington Hrbr	27/Feb	08/Mar	334	2	1.95	90	1.17
Ward Pt	27/Feb	08/Mar	20	6	2.80	90	0.30
Ward Pt	27/Feb	08/Mar	30	4	1.90	90	0.21
Ward Pt	27/Feb	08/Mar	20	2	1.70	75	0.05
Ward Pt	27/Feb	08/Mar	20	12	0.70	50	0.08
Ward Pt	27/Feb	08/Mar	65	4	1.80	75	0.35
Ward Pt	27/Feb	08/Mar	40	4	3.20	80	0.41
Ward Pt	27/Feb	08/Mar	78	4	3.25	80	0.81
Ward Pt	27/Feb	08/Mar	260	4	2.50	70	1.82

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 13: Quathiaski			Continued				
Ward Pt	27/Feb	08/Mar	205	4	3.40	80	2.23
Ward Pt	27/Feb	08/Mar	55	6	4.20	90	1.25
Ward Pt	27/Feb	08/Mar	107	6	3.40	90	1.96
Ward Pt	27/Feb	08/Mar	57	10	2.80	80	1.28
Ward Pt	27/Feb	08/Mar	78	4	2.60	80	0.65
Ward Pt	27/Feb	08/Mar	50	4	4.70	75	0.71
Ward Pt	27/Feb	08/Mar	54	4	1.90	80	0.33
Ward Pt	27/Feb	08/Mar	72	6	4.60	80	1.59
Ward Pt	27/Feb	08/Mar	102	4	3.80	70	1.09
Ward Pt	27/Feb	08/Mar	45	3	2.40	70	0.23
Ward Pt	27/Feb	08/Mar	478	2	3.40	70	2.28
Ward Pt	27/Feb	08/Mar	44	2	2.60	70	0.16
Ward Pt	27/Feb	08/Mar	208	4	3.70	80	2.46
Ward Pt	27/Feb	08/Mar	65	6	3.70	80	1.15
Ward Pt	27/Feb	08/Mar	60	2	2.80	80	0.27
Ward Pt	27/Feb	08/Mar	74	6	2.40	70	0.75
Ward Pt	27/Feb	08/Mar	150	12	2.80	70	3.53
Ward Pt	27/Feb	08/Mar	40	2	1.70	70	0.10
Ward Pt	27/Feb	08/Mar	92	2	1.80	70	0.23
Ward Pt	27/Feb	08/Mar	55	4	1.80	70	0.28
Ward Pt	27/Feb	08/Mar	130	2	3.80	80	0.79
Ward Pt	27/Feb	08/Mar	265	2	2.60	80	1.10
Ward Pt	27/Feb	08/Mar	150	2	1.80	70	0.38
Ward Pt	27/Feb	08/Mar	150	2	1.00	70	0.21
Ward Pt	27/Feb	08/Mar	30	4	1.70	100	0.20
Ward Pt	27/Feb	08/Mar	265	10	1.90	80	4.03
Ward Pt	27/Feb	08/Mar	180	2	0.70	20	0.05
Ward Pt	27/Feb	08/Mar	355	4	0.70	20	0.20
Ward Pt	27/Feb	08/Mar	125	8	0.80	20	0.16
Ward Pt	27/Feb	08/Mar	97	4	0.80	20	0.06
Ward Pt	27/Feb	08/Mar	160	4	0.80	80	0.41
Ward Pt	27/Feb	08/Mar	110	2	1.70	40	0.15
Ward Pt	27/Feb	08/Mar	454	2	1.00	20	0.18
Ward Pt	27/Feb	08/Mar	168	4	2.80	80	1.51
Ward Pt	27/Feb	08/Mar	116	2	3.70	80	0.69
Ward Pt	27/Feb	08/Mar	75	2	2.80	80	0.34
Ward Pt	27/Feb	08/Mar	142	4	0.10	80	0.05
Ward Pt	27/Feb	08/Mar	52	4	0.10	80	0.02
Ward Pt	27/Feb	08/Mar	78	2	0.11	10	0.00
Ward Pt	27/Feb	08/Mar	92	10	4.20	90	3.48
Ward Pt	27/Feb	08/Mar	48	4	3.40	90	0.59
Ward Pt	27/Feb	08/Mar	84	4	4.20	90	1.27
Ward Pt	27/Feb	08/Mar	95	4	3.40	90	1.16
Ward Pt	27/Feb	08/Mar	24	4	0.20	90	0.02
Ward Pt	27/Feb	08/Mar	28	8	2.60	90	0.52
Ward Pt	27/Feb	08/Mar	229	4	4.20	90	3.46
Ward Pt	27/Feb	08/Mar	71	6	2.60	90	1.00
Ward Pt	27/Feb	08/Mar	372	4	2.80	90	3.75
Ward Pt	27/Feb	08/Mar	258	2	1.75	50	0.45

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 13: Quathiaski			Continued				
Ward Pt	27/Feb	08/Mar	208	2	0.75	60	0.19
Ward Pt	27/Feb	08/Mar	125	4	2.60	80	1.04
Ward Pt	27/Feb	08/Mar	58	2	0.75	90	0.08
Ward Pt	27/Feb	08/Mar	258	2	2.50	90	1.16
Ward Pt	27/Feb	08/Mar	112	2	3.40	90	0.69
Ward Pt	27/Feb	08/Mar	22	2	0.80	80	0.03
Ward Pt	27/Feb	08/Mar	107	2	0.75	75	0.12
Ward Pt	27/Feb	08/Mar	22	2	1.50	75	0.05
Surface Survey Area Total							72.63
Statistical Area 14: Comox							
Dive Survey							
Baynes Snd	12/Mar	12/Mar	3150	70	2.41	38	205.30
Bottom				70	1.33	7	20.69
Big Qualicum Rvr	09/Mar	12/Mar	6970	90	1.12	32	227.13
Bottom				90	0.54	6	18.67
Bowser	06/Mar	12/Mar	5200	137	1.44	41	425.88
Bottom				137	0.86	14	84.34
Boyle Pt	10/Mar	12/Mar	3500	31	1.30	33	45.88
Bottom				31	0.81	41	36.49
Cape Lazo	09/Mar	11/Mar	2975	504	2.27	40	1361.17
Bottom				504	0.75	37	416.82
Collishaw Pt	10/Mar	13/Mar	4515	250	2.65	38	1142.47
Bottom				250	0.43	31	150.76
Columbia Beach	11/Mar	12/Mar	4200	378	2.27	33	1208.32
Bottom				378	1.48	3	59.12
Comox Bar	09/Mar	09/Mar	1750	598	1.76	27	500.95
Bottom				598	0.84	20	179.52
Cottam Pt	13/Mar	13/Mar	700	89	2.54	57	89.82
Bottom				89	1.56	43	41.53
Denman Is W	12/Mar	12/Mar	1050	3	3.56	59	6.56
Bottom				3	1.00	7	0.23
Downes Pt	09/Mar	12/Mar	4550	109	5.10	39	988.62
Bottom				109	1.97	30	293.05
Englishman Rvr	11/Mar	12/Mar	3190	311	1.70	33	555.36
Bottom				311	0.67	2	9.98
Fillongley Park	10/Mar	12/Mar	3500	336	2.45	28	814.39
Bottom				336	0.96	11	126.56
Ford Cv	10/Mar	11/Mar	2800	98	4.01	29	312.63
Bottom				98	1.85	21	108.22
French Cr	10/Mar	13/Mar	3500	215	2.60	27	527.13
Bottom				215	1.34	5	48.36
Gartley Pt	11/Mar	12/Mar	2100	150	3.38	23	248.17
Goose Spit	10/Mar	11/Mar	1750	178	1.29	34	134.92

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 14: Comox			Continued				
Bottom				178	1.04	17	53.63
Gravelly Bay	10/Mar	12/Mar	2450	42	2.34	39	94.17
Bottom				42	1.71	31	55.25
Komas Bluff	10/Mar	11/Mar	2450	207	1.72	15	134.95
Bottom				207	0.75	3	12.61
Komas Bluff	10/Mar	11/Mar	3290	153	1.68	34	286.18
Bottom				153	1.08	17	93.26
Kye Bay	09/Mar	10/Mar	4550	321	1.73	36	913.24
Bottom				321	0.62	18	166.63
Little Qualicum Rvr	12/Mar	12/Mar	1470	166	2.39	21	121.54
Bottom				166	1.17	4	10.44
Little Qualicum Rvr	12/Mar	12/Mar	800	81	1.72	9	9.55
Madrona Pt	13/Mar	13/Mar	1750	41	1.71	29	36.31
Bottom				41	1.01	3	2.16
Mapleguard Pt	06/Mar	12/Mar	3150	93	1.53	34	152.14
Bottom				93	0.80	3	6.26
Norman Pt	10/Mar	12/Mar	3150	158	3.29	34	555.76
Bottom				158	1.43	25	180.25
Nuttal Bay	08/Mar	08/Mar	2560	22	0.83	41	18.95
Bottom				22	0.50	30	8.42
Parksville Bay	09/Mar	11/Mar	1750	288	2.15	36	390.87
Bottom				288	3.60	10	174.18
Qualicum Bay	12/Mar	12/Mar	2080	197	1.09	17	75.10
Bottom				197	0.13	3	1.57
Qualicum Beach	12/Mar	12/Mar	5600	236	1.79	30	717.17
Bottom				236	0.73	4	37.36
Rathtrevor Beach	11/Mar	12/Mar	700	305	1.26	41	111.51
Seal Islets	11/Mar	12/Mar	3535	431	1.72	26	690.92
Bottom				431	0.68	5	49.89
Shingle Spit	10/Mar	12/Mar	2800	182	2.61	32	426.01
Bottom				182	1.04	8	43.69
Tralee Pt	09/Mar	12/Mar	3850	104	4.20	40	668.62
Bottom				104	1.22	35	172.06
Tribune Bay	10/Mar	12/Mar	4550	59	3.62	32	316.18
Bottom				59	2.00	18	97.78
Whalebone Pt	10/Mar	12/Mar	4550	153	2.08	35	502.74
Bottom				153	1.05	30	217.09
Whaling Station Bay	09/Mar	10/Mar	4410	120	3.08	39	634.75
Bottom				120	1.28	19	131.17
Willemar Bluff	10/Mar	11/Mar	3290	156	2.84	31	446.26
Bottom				156	1.42	31	228.32
Dive Survey Area Total							19433.94

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 15: Westview							
Surface Survey							
Toba Inlt	15/Mar	16/Mar	284	2	1.80	90	0.92
Toba Inlt	15/Mar	16/Mar	193	2	0.50	70	0.14
Toba Inlt	01/Mar	02/Mar	800	3	1.60	80	3.08
Toba Inlt	18/Mar	23/Mar	629	2	0.50	75	0.48
Toba Inlt	18/Mar	23/Mar	110	2	0.80	80	0.14
Toba Inlt	18/Mar	23/Mar	200	2	1.60	80	0.51
Toba Inlt	18/Mar	23/Mar	60	6	1.60	80	0.46
Toba Inlt	18/Mar	23/Mar	97	2	2.60	80	0.40
Toba Inlt	18/Mar	23/Mar	187	6	2.50	80	2.24
Toba Inlt	18/Mar	23/Mar	184	2	1.50	80	0.44
Toba Inlt	18/Mar	23/Mar	220	1	0.80	80	0.14
Toba Inlt	18/Mar	23/Mar	456	1	0.80	50	0.18
Toba Inlt	18/Mar	23/Mar	95	2	0.41	50	0.04
Toba Inlt	18/Mar	23/Mar	120	1	0.41	50	0.02
Toba Inlt	18/Mar	23/Mar	140	1	0.70	50	0.05
Toba Inlt	18/Mar	23/Mar	376	6	0.50	50	0.57
Surface Survey Area Total							9.82
Statistical Area 17: Nanaimo							
Dive Survey							
Blackberry Pt	19/Mar	22/Mar	4840	52	3.59	32	287.90
Bottom				52	2.22	16	92.86
Blunden Pt	09/Mar	12/Mar	4515	140	0.83	34	179.29
Coffin Pt (Is)	09/Mar	12/Mar	2275	60	0.69	46	43.68
Bottom				60	0.25	7	2.42
De Courcy Is	28/Mar	29/Mar	2800	29	2.28	23	42.04
Bottom				29	1.55	15	18.74
Departure Bay	12/Mar	13/Mar	3920	22	1.10	47	45.08
Bottom				22	0.67	15	8.65
Dorcas Pt	13/Mar	13/Mar	1400	26	1.56	42	23.61
Bottom				26	1.11	24	9.59
Hammond Bay	12/Mar	12/Mar	1575	107	1.99	42	140.07
Bottom				107	0.44	16	12.14
Horswell Bluff	11/Mar	13/Mar	3650	156	1.86	59	620.35
Bottom				156	0.99	36	200.62
Icarus Pt	09/Mar	12/Mar	1435	154	0.91	43	86.15
Icarus Pt	09/Mar	12/Mar	1400	464	1.58	31	317.57
Bottom				464	1.02	13	86.98
Jack Pt	13/Mar	14/Mar	1900	57	2.72	40	116.68
Bottom				57	1.70	18	33.83
Kulleet Bay	22/Mar	24/Mar	5860	25	1.13	43	68.83
Bottom				25	0.12	13	2.12
Lagoon Hd	11/Mar	13/Mar	1365	88	1.80	49	106.42

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 17: Nanaimo			Continued				
Bottom				88	1.41	35	58.44
Lantzville	11/Mar	12/Mar	2030	132	1.29	38	131.83
Bottom				132	1.17	9	27.62
Maude Is	11/Mar	11/Mar	1400	38	1.95	75	78.87
Bottom				38	1.13	59	35.69
McKay Pt	12/Mar	13/Mar	1400	188	1.11	32	92.69
Bottom				188	1.10	9	24.99
Nanaimo	14/Mar	14/Mar	1000	9	1.40	66	7.85
Bottom				9	0.50	60	2.57
Nankivell Pt	13/Mar	13/Mar	4550	40	2.53	56	256.74
Bottom				40	1.87	13	44.09
Nanoose Bay	09/Mar	13/Mar	350	20	0.01	40	0.03
Nanoose Bay Hd	09/Mar	13/Mar	350	2	0.25	40	0.07
Nanoose Bay Hd	09/Mar	13/Mar	350	10	0.33	100	1.17
Nares Pt	13/Mar	14/Mar	2450	71	2.40	37	154.73
Bottom				71	0.95	12	19.99
Neck Pt	09/Mar	13/Mar	2485	82	1.60	43	140.90
Bottom				82	1.46	45	132.41
Newcastle Chnl	13/Mar	13/Mar	300	6	1.75	63	1.97
Bottom				6	0.75	100	1.36
Protection Is E	13/Mar	14/Mar	2100	139	2.14	52	327.17
Bottom				139	1.41	22	91.27
Ranch Pt	10/Mar	13/Mar	3570	47	2.55	51	216.87
Bottom				47	1.77	33	97.38
Ruth Is	11/Mar	11/Mar	525	38	0.07	83	1.15
Schooner Cv	13/Mar	14/Mar	2100	56	2.71	58	185.21
Bottom				56	2.56	14	40.66
Southey Is	11/Mar	11/Mar	1860	185	1.83	67	421.34
Bottom				185	1.21	41	172.36
Sunrise Beach +	09/Mar	12/Mar	2835	198	1.80	68	684.51
Bottom				198	1.54	34	289.54
Valdes Is	19/Mar	29/Mar	3240	89	4.28	34	421.71
Bottom				89	2.20	21	135.72
Wallis Pt	11/Mar	13/Mar	3500	99	2.52	48	417.42
Bottom				99	1.46	40	201.74
Dive Survey Area Total							7463.66

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 18: Cowichan							
Dive Survey							
Ganges Hrbr	26/Mar	26/Mar	3850	13	2.46	36	44.41
Bottom				13	1.00	23	11.82
Dive Survey Area Total							56.24
Statistical Area 23: Barkley Sound							
Dive Survey							
Forbes Is	03/Mar	03/Mar	1400	210	1.28	27	102.66
Bottom				210	0.70	14	29.58
Stopper Is	17/Mar	17/Mar	7350	97	1.30	31	282.85
Bottom				97	0.81	35	198.95
Macrocystis			2100	80	2.83		53.92
Two Rivers +	23/Feb	02/Mar	2100	416	1.03	57	513.86
Bottom				416	0.63	48	263.96
Dive Survey Area Total							1445.78
Statistical Area 24: Clayoquot Sound							
Dive Survey							
Baseball Cv +	22/Mar	29/Mar	1050	194	4.38	21	183.90
Bottom				194	1.93	19	73.04
Macrocystis			1050	100	2.42		43.38
Hesquiat Hrbr	22/Mar	23/Mar	1050	21	0.01	94	0.21
Hesquiat Pt	22/Mar	22/Mar	575	106	0.11	70	4.50
Hootla Kootla +	22/Mar	29/Mar	700	214	2.43	24	88.87
Bottom				214	2.00	1	1.87
Leclaire Pt	/	/	950	103	0.28	28	7.60
Bottom				103	0.05	31	1.52
Dive Survey Area Total							404.88

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 25: Nootka Sound							
Dive Survey							
Inner Nuchatlitz	14/Mar	16/Mar	2450	94	1.80	27	112.68
Bottom				94	0.08	4	0.75
Macrocystis				62	2.00		
Inner Nuchatlitz	14/Mar	16/Mar	2625	313	2.57	25	521.81
Bottom				313	1.54	20	247.00
Macrocystis			1400	37	1.13		6.58
Outer Nuchatlitz	14/Mar	16/Mar	3150	281	1.00	23	205.03
Bottom				281	0.38	17	57.90
Macrocystis			3150	66	1.81		14.52
Owossitsa Cr	14/Mar	16/Mar	1050	36	2.19	24	19.69
Bottom				36	0.43	63	10.29
Macrocystis			3150	22	2.02		36.14
Port Langford	04/Mar	05/Mar	3050	79	1.96	26	123.85
Bottom				79	0.95	40	92.17
Port Langford	04/Mar	05/Mar	800	107	2.22	37	70.67
Rosa Hrbr	14/Mar	16/Mar	700	169	2.42	25	71.34
Bottom				169	0.84	13	13.16
Macrocystis			1750	117	2.63		12.15
Rosa Is	15/Mar	16/Mar	1050	133	1.43	11	21.74
Bottom				133	1.00	1	1.27
Macrocystis			1050	89	0.88		5.69
Dive Survey Area Total							1644.43
Statistical Area 26: Kyuquot Sound							
Dive Survey							
Atkis Is	26/Mar	27/Mar	300	212	2.00	37	47.32
Bottom				212	0.09	14	0.82
Spring Is	26/Mar	27/Mar	800	168	2.97	40	158.70
Bottom				168	0.85	18	19.90
Dive Survey Area Total							226.75

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 27: Quatsino Sound							
Dive Survey							
Flint Rk	12/Mar	15/Mar	900	10	1.15	51	5.28
Bottom				10	0.01	2	0.00
Forward Inlt	12/Mar	15/Mar	2650	34	0.83	37	27.37
Bottom				34	0.36	25	7.91
Macrocystis			1750	57	0.95		28.49
Moores Is	12/Mar	15/Mar	1800	26	1.66	47	36.62
Quashtin Cr	12/Mar	15/Mar	4060	21	1.17	40	39.59
Bottom				21	0.13	9	0.95
Wedel Is	12/Mar	15/Mar	1300	46	0.07	21	0.89
Dive Survey Area Total							147.11
Statistical Area 29: Fraser River							
Dive Survey							
Valdes Is East	30/Mar	31/Mar	3920	28	1.97	36	78.13
Bottom				28	1.13	18	22.22
Dive Survey Area Total							100.35

Table 6. 2004 SOK Licences and landed product weight (lbs.) by statistical area and location.

Geographic and Statistical area	Harvest Location	# of licences	Spawn-on-Kelp Quota (lbs.)	Harvest (lbs.)
Queen Charlotte Islands				
Area 2E	Huston Inlet			72,511
	Selwyn Inlet			21,945
	Jedway Bay			10,310
	Del la Beche			48,191
Area subtotal		**10**	**161,460**	**152,957**
Prince Rupert				
Area 4	Island Point	7	113,419	28,980
	Tugwell Island			27,679
	Stuman Bay			26,894
Area 5	North Gurd Island	3	48,372	51,581
Area subtotal		**10**	**161,791**	**135,134**
Central Coast				
Area 6/7/8	Higgins Pass	15	327,098	30,745
	Kitasu Bay			32,808
	Spiller Channel			240,000
	Illahie Inlet			31,450
Area 10/12	Takush/Beaver harbour	4	66,177	66,192
Area Subtotal		**19**	**393,275**	**401,195**
WCVI				
Area 23/24/25/27	Rosa Harbour			32,292
	Baseball Bay			7,775
	Stopper Islands			17,229
	Winter Harbour			45,501
Area Subtotal		**7**	**112,363**	**102,797**
Coastwide Total		**46**	**828,889**	**792,083**

Table 7. 2003 Catch and allocation (tons) for food and bait, ZX, ZY charity and aquarium use by statistical area.

	Area 4	Area 11	Area 12	Area 13	Area 14	Area 16	Area 17	Area 18	Total Catch	Allocated
St. of Georgia Winter Food and Bait					548.8		182.3		731.1	900
Fjord ZY					104.2		93.3		197.5	200
Walcan ZY				175.0	5.0	110.0			290.0	300
Charity				42.0	30.0		80.0		152.0	275
Aquarium					71.1			25.9	97.0	110
ZX Personal Use Bait		0.1	0.5						0.6	55
ZY Other Use Bait	12.0		0.1	9.0	2.5	7.3			30.9	220
Totals:	**12.0**	**0.1**	**0.6**	**226.0**	**761.6**	**114.2**	**355.6**	**25.9**	**1499**	**2060**

Table 8. 2004 Test fishing vessels by category.

# of Vessels	Category	Vessel Names	Region Worked	License Required	Payment Type
3	Assessment Vessels	Lasqueti Star	Central	GN	Seine Fish
		Avalon	Gulf	GN	Seine Fish
		Kristen Joye	Gulf	GN	Seine Fish
		Free To Wander	WCVI	GN	Seine Fish
2	Dive Spawn Survey	Haida Provider	QCI	GN	Seine Fish
		Pachena No. 1	Gulf/CC	GN	Seine Fish
3	GN Test / Dive Spawn Survey	Royal Pride	Rupert	GN	Gillnet Fish
		Silver Viking	Gulf	GN	Gillnet and Seine Fish
		Thunder No.1	Gulf	GN	Gillnet and Seine Fish
2	Surface Spawn Survey	Port Lincoln	Area 12	None	Cash
		Discovery Huntress	Area 13	None	Cash
3	Seine Test / Dive Spawn Survey*	Christav	Central	SN	Seine Fish
		Royal Viking	WCVI	SN	Seine Fish
		Viking Joy	WCVI	SN	Seine Fish
11	Seine Test	Queens Reach	QCI	SN	Seine Fish
		Ocean Horizon	QCI	SN	Seine Fish
		Pacific Skye	Rupert	SN	Seine Fish
		Western Warrior	Rupert	SN	Seine Fish
		Kynoc	Central	SN	Seine Fish
		Ocean Venture	Gulf/Central	SN	Seine Fish
		Savage Fisher	Gulf	SN	Seine Fish
		Royal Mariner	Gulf	SN	Seine Fish
		Angela Lynn	Gulf	None	Seine Fish
		Bernice C	Gulf	None	Seine Fish
		Viking Pride	WCVI	SN	Seine Fish
1	Coded Wire Tagging	Ocean Marauder	WCVI /CC	None	Seine Fish

* All dive spawn survey vessels supplied 4 WCB approved "occupational scuba" certified divers.

Table 9. 2004 Test fishing vessels, dates of operations, and payment requirements (tons).

Area	Vessel	Captain	Dates	Duration (days)	Rate	Payment Location	Total (Tons)
2E	Queens Reach	Legate	Feb 24 - Mar 22	28	4.19	Rupert	117.32
2W	Ocean Horizon	Jensen	Mar 10 - Apr 06	28	4.10	Gulf	114.8
Dive Platform	Haida Provider	Brillon	Mar 15 - Apr 25	26	3.60	WCVI	93.6
Rupert	Western Warrior	Curic	Mar 10 - Apr 04	26	3.90	Rupert	101.4
Rupert	Pacific Skye	Ashton	Mar 10 - Apr 04	26	4.19	Rupert	108.94
Rupert - GN^	Royal Pride	Malcolm	Mar 9 - Apr 17	40	2.95 GN 3.40 SN	Rupert	122.805
Central	Kynoc	Wilson	Mar 02 - Mar 31	30	4.50	Central	135.0
Central ^	Christav	Stava	Mar 09 - Apr 12	35	4.40	Central	154.0
Central	Lasqueti Star	Heskin	Mar 09 – Mar 29	21	2.75	Central	57.75
CC/Gulf Dive	Pachena No. 1	Ponak	Mar 14 - Apr 12	30	3.95	Central	118.5
Gulf	Savage Fisher	Carr	Feb 23 -Mar 19	26	4.09	Gulf	106.34
Gulf	Royal Mariner	Farac	Feb 25- Mar 21	26	4.19	Gulf	108.94
Gulf / CC	Ocean Venture	Budden	Feb 25 – Mar 9 Mar 10- Mar 23	30	3.88	Gulf	116.4

Table 9. Continued

Area	Vessel	Captain	Dates	Duration (days)	Rate	Payment Location	Total (Tons)
Gulf	Angela Lynn	Tobin	Feb 27 – Mar 10	13	1.65	Gulf	21.45
Gulf	Bernice C	Melan	Feb 29 – Mar 10	11	1.80	Gulf	19.8
Gulf (seine)	Avalon	Pierce	Feb 25 - Mar 16	21	3.00	Gulf	63.0
Gulf (gillnet)	Kristen Joye	Widsten	Feb 28 - Mar 19	21	2.90	Gulf	60.9
Gulf - GN ^	Thunder No. 1	Hegglund	Mar 04 - Apr 04	32	3.05 GN 3.50 SN	Gulf	104.81
Gulf - GN ^	Silver Viking	Wing	Mar 04 - Apr 04	32	3.29 GN 3.70 SN	Gulf	108.92
CWT	Ocean Marauder	Lenic	Mar 03 - Apr 01	30	3.20	Gulf	96
Area 12	Port Lincoln	Neidrauer		30	$625		$18,750
Area 13	Dis. Huntress	Bunn		30	$625		$18,750
WCVI	Viking Pride	Olsen	Feb 23 - Mar 19	26	3.64	WCVI	94.9
WCVI ^	Royal Viking	Holkestad	Feb 27 - Apr 01	35	4.19	WCVI	146.65
WCVI ^	Viking Joy	Houston	Feb 27 - Apr 01	35	4.09	WCVI	143.15
Area 27	Nita Maria	Vogrig	Feb 29 - Mar 13	14	2.15	Rupert	30.1
WCVI	Free to Wander	Widsten	Mar 01- Mar 21	21	2.79	WCVI	58.59

QCI = Queen Charlotte Islands; Rupert = Prince Rupert Division; Central = Central Coast; Gulf = Strait of Georgia; WCVI = West Coast Vancouver Island; ^ dive & test

Table 10. 2004 Test fish payment requirement by region and catch (tons) by location

Region	Stat Area	Herring Section	Location	Gear	Catch (tons)	Requirement (tons)
Prince Rupert	4	042	Duncan Bay / Tree Bluff	Gillnet	86.530	
	5	052	Gurd Point	Seine	457.628	
			Prince Rupert Total:		**544.158**	**480.565**
Central Coast	7	072	Fisher Point / Wooton Island	Seine	733.953	465.25
	14	142	Ford Cove / Columbia Beach	Gillnet	48.72	
	14	143	Columbia Beach	Gillnet	34.562	
Strait of Georgia	17	172	Richard Point	Gillnet	41.482	
				Seine	0	
			Strait of Georgia Total:		**124.764**	**921.365**
WCVI	25	253	Esperanza	Seine	566.951	536.89
				COASTWIDE TOTALS	**1,969.826**	**2,404.07**

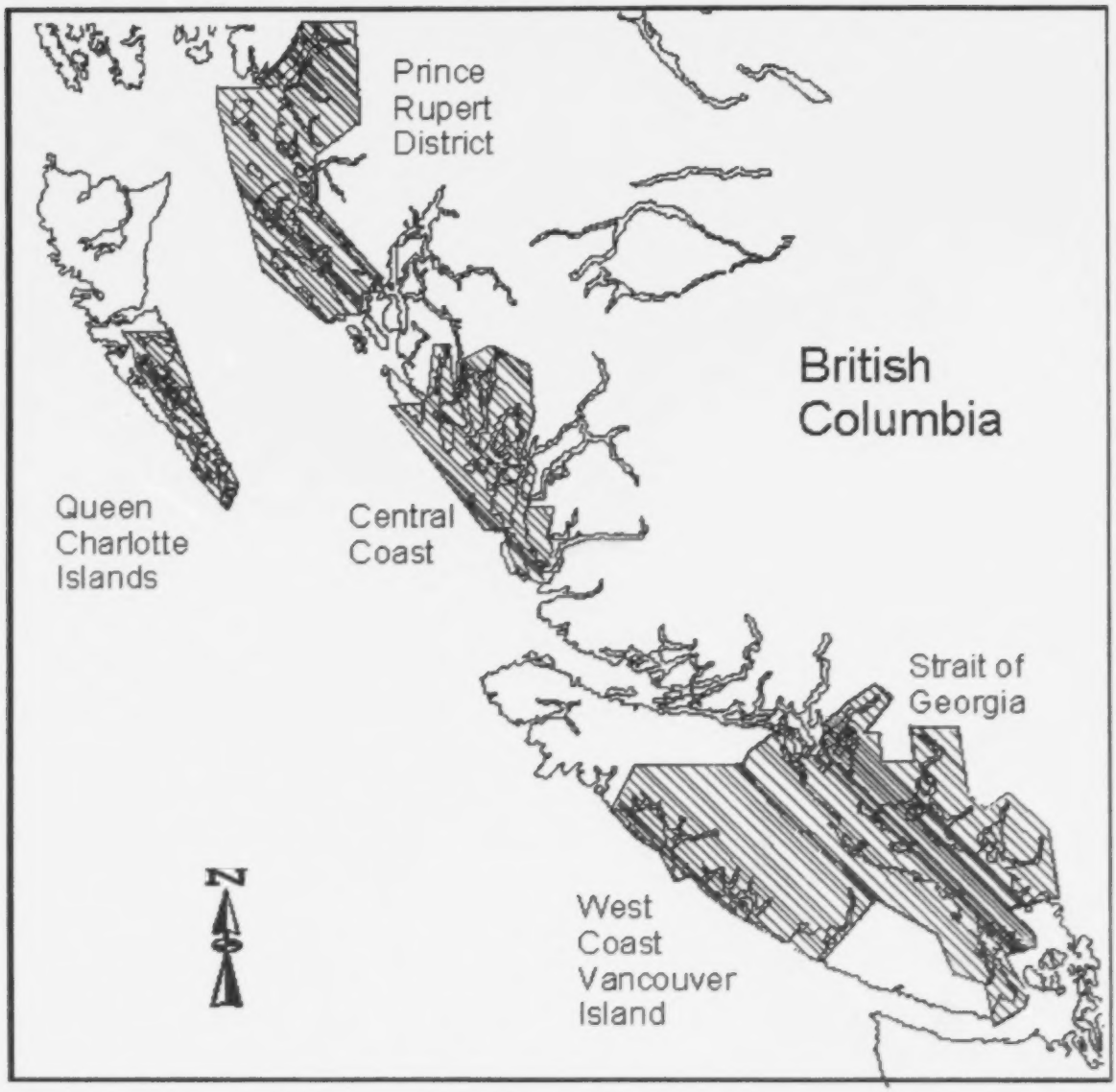

Figure 1. Herring stock assessment regions in British Columbia

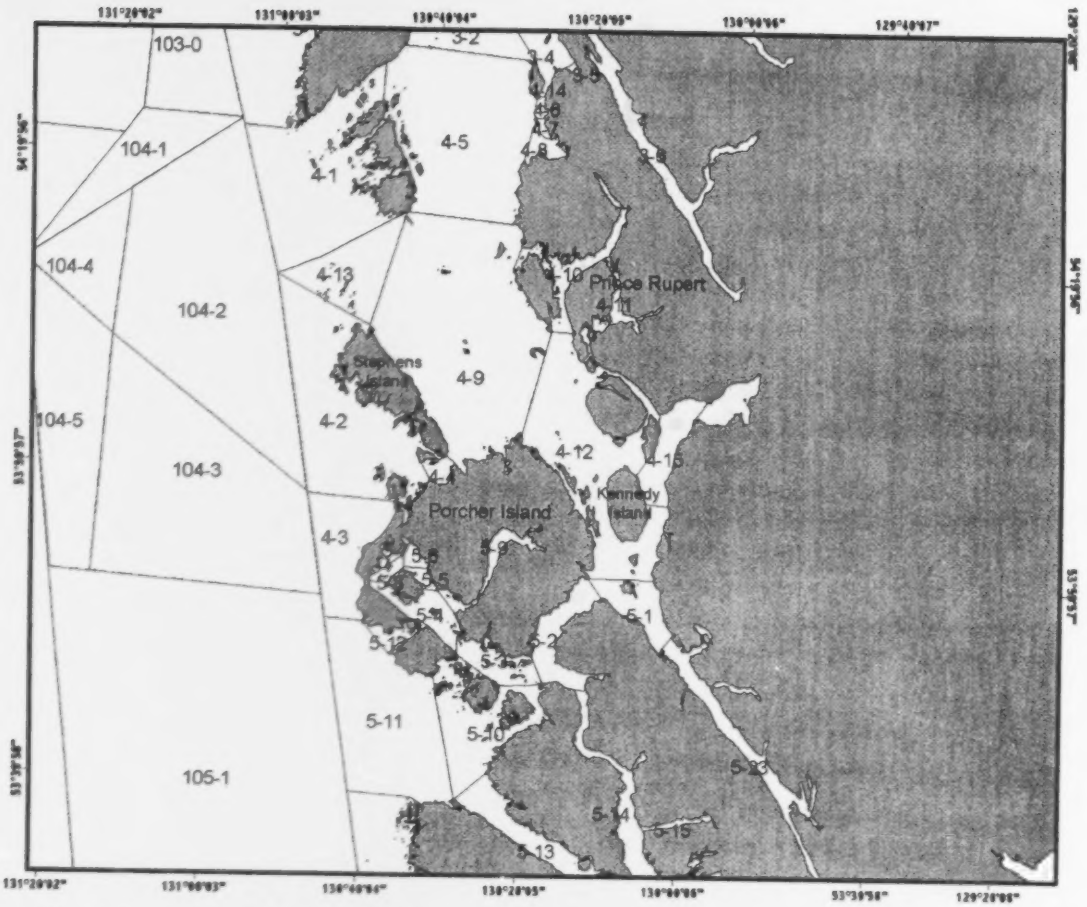

Figure 2. Subareas open for 2004 Prince Rupert roe herring seine fishery: 5-4, 5-5 and portions of 5-6. Subareas open for the 2004 gillnet fishery: 4-5 to 4-9 and 4-14.

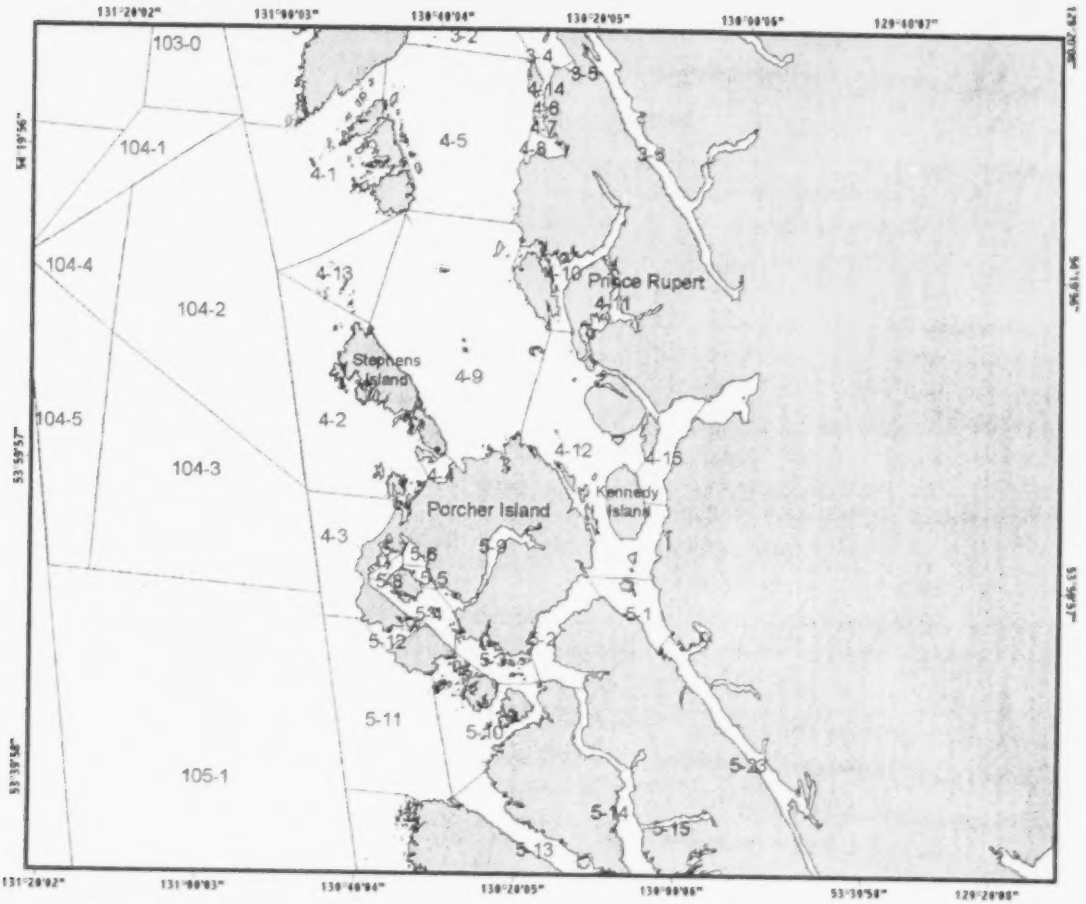

Figure 2. Subareas open for 2004 Prince Rupert roe herring seine fishery: 5-4, 5-5 and portions of 5-6. Subareas open for the 2004 gillnet fishery: 4-5 to 4-9 and 4-14.

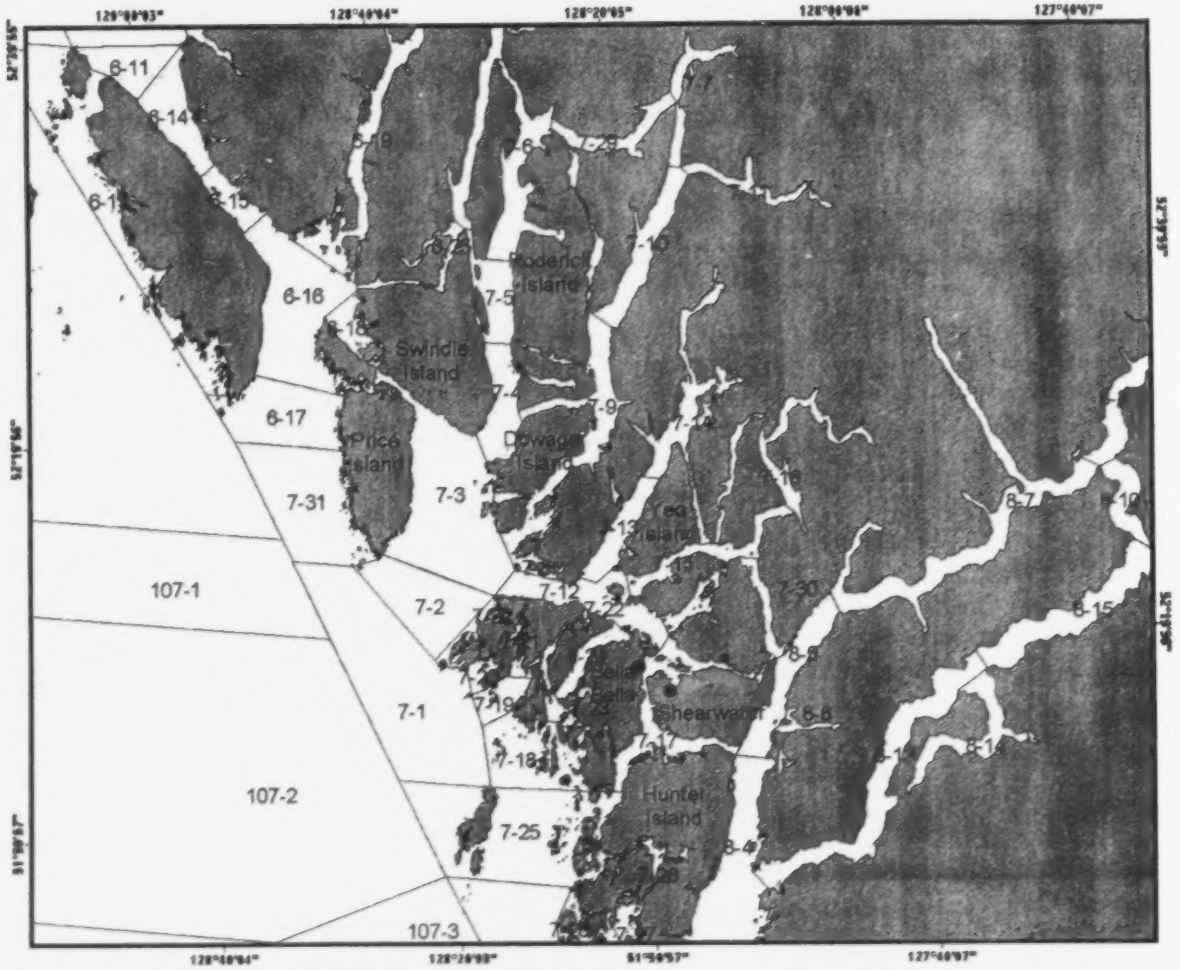

Figure 3. Subareas open for the 2004 Central Coast roe herring seine fishery: 7-13 and portions of subareas 7-8 and 7-12.

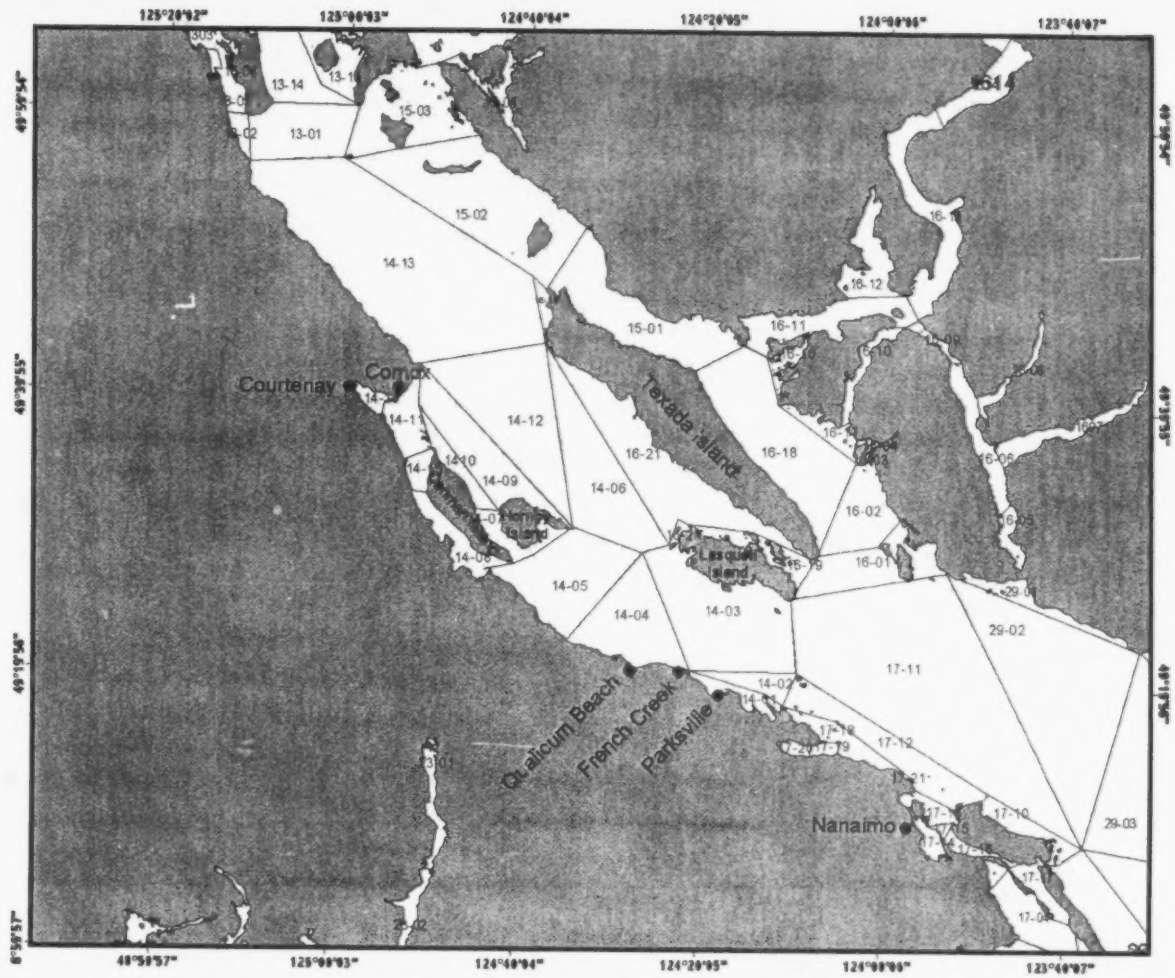

Figure 4. Subareas open for the 2004 Strait of Georgia roe herring seine fishery: 14-8, 14-11, 14-14 and 14-15. Subareas open for the 2004 gillnet fishery: Area 14 and area 17 excluding subarea 17-20.

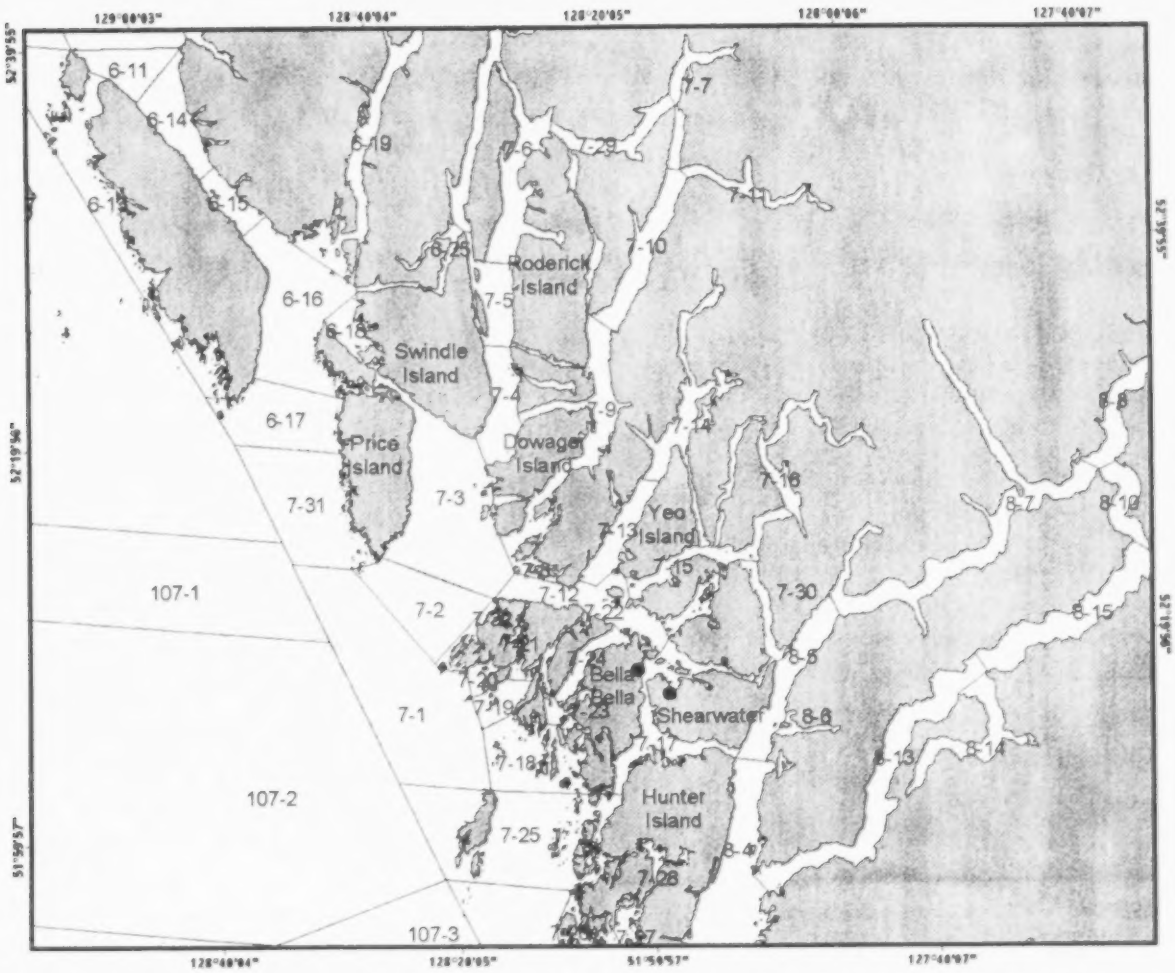

Figure 3. Subareas open for the 2004 Central Coast roe herring seine fishery: 7-13 and portions of subareas 7-8 and 7-12.

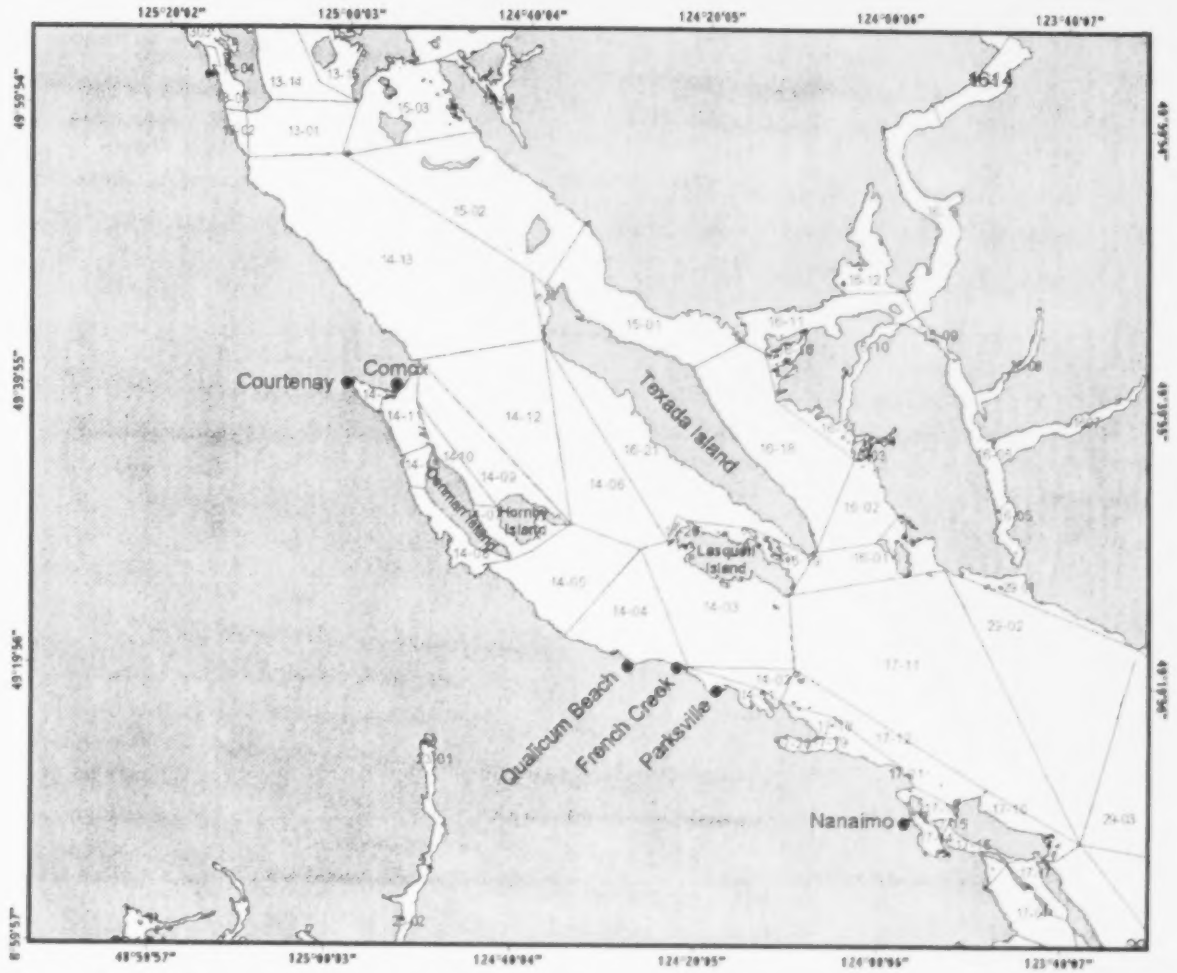

Figure 4. Subareas open for the 2004 Strait of Georgia roe herring seine fishery: 14-8, 14-11, 14-14 and 14-15. Subareas open for the 2004 gillnet fishery: Area 14 and area 17 excluding subarea 17-20.

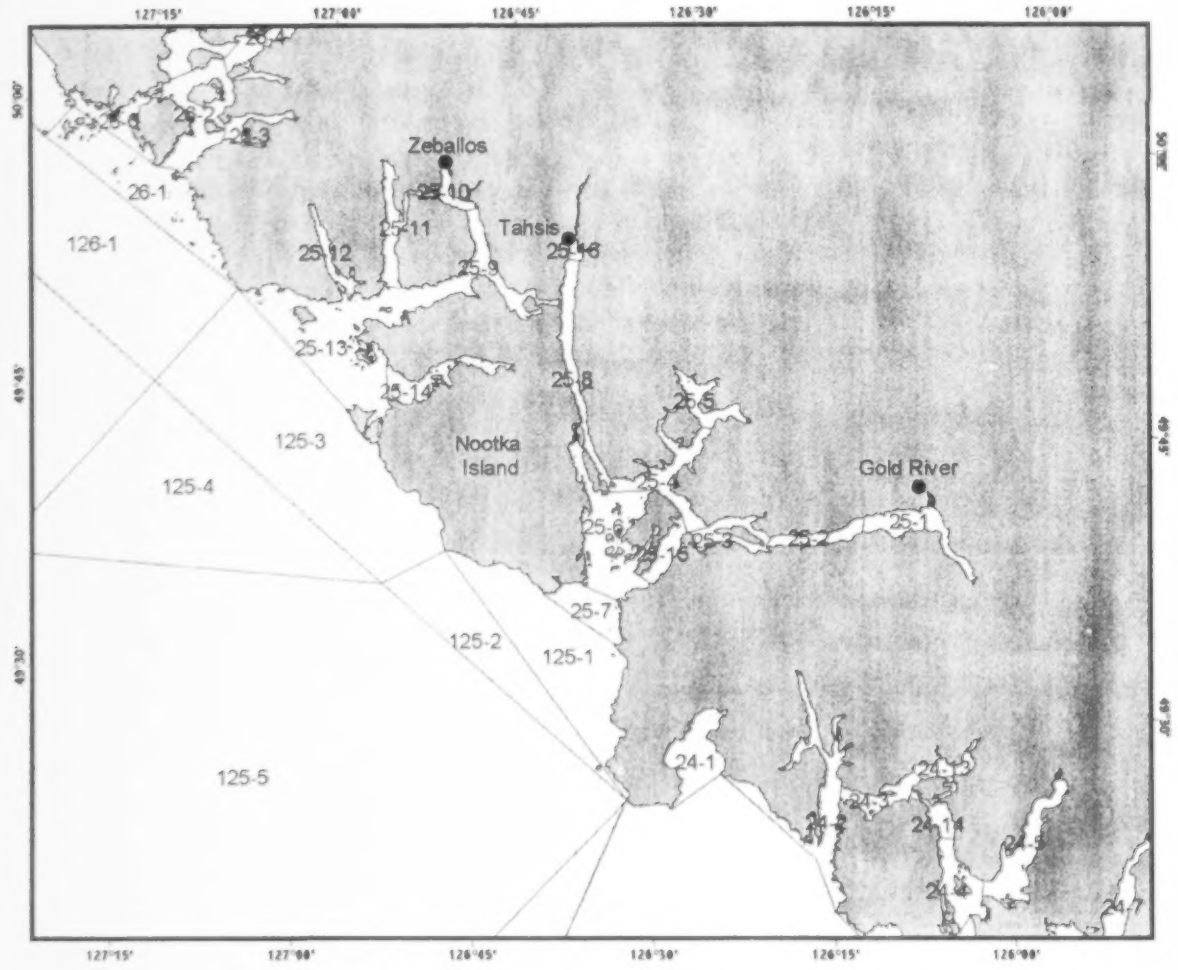

Figure 5. Subareas open for the 2004 WCVI roe herring seine fishery: 25-13. Subareas open for the 2004 WCVI roe herring gillnet fishery: portions of 25-13.

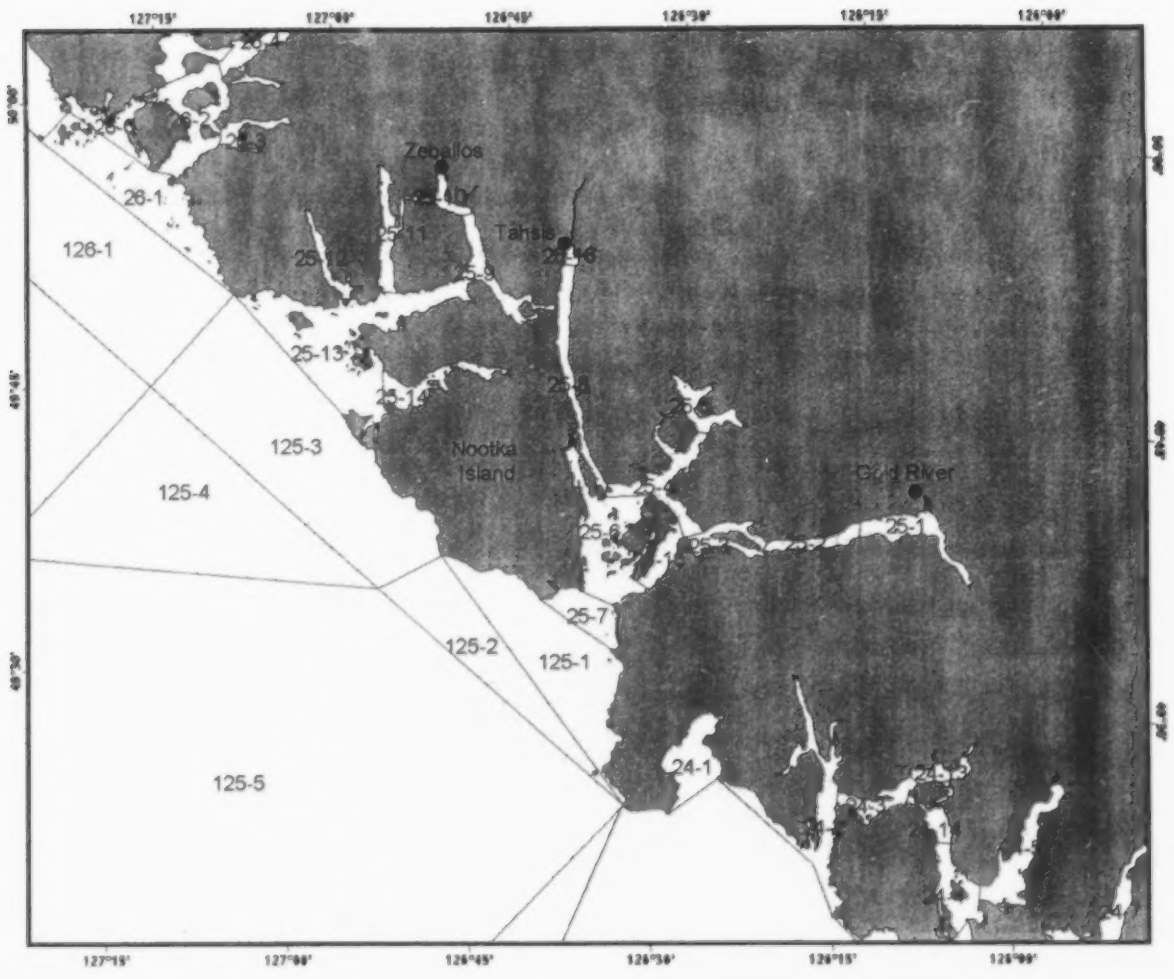

Figure 5. Subareas open for the 2004 WCVI roe herring seine fishery: 25-13. Subareas open for the 2004 WCVI roe herring gillnet fishery: portions of 25-13.